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1. *The Foreign Body Itself.*—A safety-pin gives but few changes and may not obstruct the passage of air sufficiently to cause any local signs in the lungs supplied by the bronchus in which it lies. A small metallic body may set up slight local irritation but interfere little with the passage of air. A round body such as a seed or nut may completely obstruct a bronchus at once and shut off the portion of lung supplied. In other cases the obstruction may not be complete at first, but soon becomes so by the resulting swelling of the mucous membrane. The blocking may be intermittent and give changing signs.

2. *Irritation and Inflammation.*—These vary greatly, dependent to a large extent on the character of the foreign body. A peanut sets up an intense inflammatory process which causes signs of itself and by swelling of the mucous membrane may completely close the bronchus. The inflammation may extend to other bronchi than the one affected. In cases of some duration the formation of granulations may extend for some distance.

3. *The Presence of Secretions.*—These may cause signs in the lung supplied by the affected bronchus. If air and secretions are both present many signs—especially on auscultation—are produced. If secretions accumulate and the air-supply is cut off, the air present is absorbed and the signs of a collapsed or "waterlogged" lung result. Secretions may pass into other portions of the affected lung or to the bronchi of the opposite side and cause signs there.

4. *Shifting of the Foreign Body.*—This is not infrequent and may be responsible for signs in two lobes or in both lungs. The picture at first is confusing and the greatest safeguard is in studying the signs carefully for a short period. The area first affected usually clears rapidly after the foreign body has shifted.

Anatomically it may aid to remember that there are several classes of cases: (1) Those in which a bronchus is completely plugged by the foreign body or by it plus swelling of the mucous membrane. In this case the signs should be easy of interpretation as the supplied lung is without air, collapses to a greater or less extent, and usually soon contains considerable fluid and secretion. (2) Those in which the bronchus is partially occluded and in which air and secretions are both present—perhaps in varying amounts at different times. (3) Those in which the foreign body acts as a ball-valve and in which the amount of air in the affected lung is greater than normal. The condition should be readily recognised by careful examination, especially by inspection.

METHODS OF EXAMINATION.

Inspection.—This cannot be too thorough and in restless children time and patience may be necessary. Inspection of the back should not be forgotten. It may be stated as a rule—from which it is doubtful if there are any exceptions—that there is always decreased expansion on the affected side. If the foreign body has shifted from one side to the other or portions of a foreign body (such as a nut) are present on both sides, then the change in expansion will be bilateral. The affected side may show some decrease in size, most evident if a lower lobe is affected, the bronchus is completely occluded, and collapse has occurred. If the foreign body has a ball-valve action the affected side is often larger but shows decreased expansion. The evidence of the extent of movement of the diaphragm should be carefully studied. It is less on the affected side, more especially if a lower lobe is involved. Evidence of displacement of the heart may be evident.

In some cases the only observable change is *decreased expansion*. This is seen particularly when the foreign body is metallic, such as a pin. It occurs when there is no evidence of obstruction to the passage of air or of changes in the bronchi or lung beyond the foreign body. The explanation of this phenomenon is difficult to give, but it probably represents a sensory reflex. The foreign body irritates a sensory ending in the bronchial mucosa which may result in a reflex contraction of the bronchial muscles. W. S. Miller[1] has shown that the action of the bronchial muscles in expiration is active rather than passive. The work of O. Larsell shows a mechanism which allows of expansion and contraction of the bronchi longitudinally during inspiration and expiration. Interference with the normal action of the bronchial musculature may be thus explained.

Palpation.—The transmission of the voice vibrations will vary with the degree to which the bronchus is occluded. If this is complete the vibrations are absent or present to a very slight extent. Accurate observation in children is often difficult. The voice may not be strong enough to set up vibrations of any force, in which case advantage should be taken of crying. In some cases in which there is "drowned lung" there may be some transmission of the vibrations, but this is usually slight. With a partially plugged bronchus the vibrations vary from time to time, but are likely to be somewhat decreased.

Percussion.—If the possible anatomical changes are kept in mind there should not be much difficulty in interpreting the findings. As many of the cases occur in children, it should be remembered that in them tympany is a common finding with various pathological conditions. If the foreign body allows air to enter, but not to leave an area of lung the note will be hyper-resonant or tympanitic. On comparison with the opposite side, the normal lung may seem to yield an impaired note. Careful inspection and percussing first on the normal side should prevent this error. If

[1] Amer. Rev. Tuberculosis, 1921, v., 689.

the bronchus is completely plugged, as soon as the contained air is absorbed, the note shows dullness to flatness. Shortly after the bronchus is occluded, there may be collapse of the lung giving a quality of tympany associated with dullness. Later, as secretions accumulate, the note becomes flat. In case of partial obstruction or obstruction which varies in degree from time to time, there will be varying combinations of dullness, normal resonance, and tympany. The reason for the alterations is evident, as the quantity of contained air, the amount of retained secretion, and the extent of collapse of the lung vary from time to time. In case of doubt in such cases a study of the signs at intervals usually clears up any difficulty. Marked changes are sometimes seen in a few hours if there is considerable secretion which accumulates for a time and then escapes, allowing some air to enter. The signs may be somewhat the same as may be found in cases of abscess, which is often present in cases of some duration.

There are some findings which deserve mention. In children in whom the lower lobe bronchus is completely blocked there may be flatness in the axilla and adjoining back to about the scapular line, but between the latter and the spine there is dullness with a varying degree of tympany. This may occur in cases of long duration, so that it cannot always be due to some air being retained. Is it possible that in these cases there is some shifting over of the opposite lung and that the note is transmitted from it? In these cases distant blowing breathing is sometimes heard over the same area. Another change is apparently due to collapse of the lower right lobe. If this occurs suddenly, with marked displacement of the heart to the right, the middle lobe is shifted to the right and resonance is found over an area usually occupied by the lower lobe.

The sense of *resistance* does not aid greatly except in cases of flatness over a lower lobe when a diagnosis of effusion—serous or purulent—might be made. The resistance over a "drowned lung," or one containing much secretion, is not as marked as over pleural fluid. In an occasional case in which there is a great accumulation of fluid and secretion below a body which completely plugs the bronchus, the sense of resistance may be marked and even suggest pleural effusion. In such a case it is the resistance of fluid in the lung which we are feeling. Extreme difficulty, however, is rare.

Auscultation.—The study of the breath sounds is often very helpful and sometimes most confusing. If one lung is shut off, the respiration will be more marked on the other side and the breath sounds over the sound lung exaggerated and harsher, but not altered in their essential quality. Over the lung supplied by an occluded bronchus the breath sounds are absent or very much decreased. In such cases it is not uncommon in children to hear very distant breath sounds which may have a slight blowing quality, but they do not have the character of pneumonic breath sounds. This is neither invariable in cases with the same variety of foreign body nor constant in the same patient. If the bronchus is partially plugged the breath sounds are harsh and may have a blowing quality with prolonged expiration. The loudness and roughness are dependent on the extent of the narrowing due to the foreign body and to the presence of secretions. In these partially occluded cases the breath sounds often vary from hour to hour. The voice sounds are fairly parallel to the breath sounds.

Râles.—Their number and character depend on the amount of secretion and the changes in the mucous membrane, and hence there are many possibilities for variation. The secretions may, and often do, enter into other bronchi than the one involved, and not infrequently the resulting râles are louder and more numerous over other portions of the lungs than the one supplied by the affected bronchus. This is especially marked in the peanut cases in which there is a general tracheo-bronchitis. The râles are loud and coarse, and occur with respiration and expiration. Râles are often heard over the upper lobe of the lung when the foreign body is in the lower lobe bronchus. They vary in character, but are usually medium or coarse. If there is partial occlusion with some air and secretion below the foreign body, many râles are usually heard, some of which may be bubbling. Over the area supplied by a completely plugged bronchus there are no râles as a rule. In some cases râles are particularly loud over the area where the foreign body is situated.

In a few cases of a small metallic foreign body peculiar râles, very fine in character, have been heard over a limited area corresponding to the situation of the foreign body. These occur usually at the end of inspiration and suggest the crackling of very fine soft tissue paper. They are not loud, but have a characteristic fine quality.

With a foreign body in the trachea there may be very loud râles of many kinds heard throughout both sides of the chest. In narrowing of the larynx from œdema there may be similar findings with rough breath sounds, the cause of which is evident.

SIGNS PRODUCED BY VARIOUS KINDS OF FOREIGN BODY.

Pins.

The aspiration of pins, either the ordinary or safety variety, is comparatively common and will continue as long as the mouth is used as a holder for them. With a pin held in the lips, the person may be startled, cough, or begin to laugh, any of which may result in the pin being aspirated.

Safety-pin in Bronchus.—A woman, aged 32 years, two weeks previously coughed while holding a safety-pin in the mouth and aspirated it. She had a severe attack of coughing immediately and after this she had a tickling sensation and an occasional hacking cough. On examination she was comfortable without dyspnœa or cough. The only physical sign was diminished expansion on the left side. There was no change on percussion and the breath sounds were everywhere clear and the same on the two sides. The X ray study showed the pin (Fig. 1) in the left main bronchus without any evidence of change in the lung beyond the pin. Three hours after the removal of the pin by Dr. Jackson the expansion was found to be equal on the two sides.

A child, aged 10 months, was brought with the history that a week before the parents heard her choking and found her with severe dyspnœa. A small safety-pin which had been fastened in her clothing was missing. An X ray examination showed the safety-pin in a bronchus and two unsuccessful attempts at removal were made elsewhere. On examination the child seemed perfectly well and there was no dyspnœa or cyanosis. On inspection there was markedly decreased expansion of the right side, most marked below. Percussion was normal throughout and no difference could be found. The breath sounds were perhaps slightly rougher in the lower right axilla, but the difference was very slight. Not a single râle was heard. On bronchoscopy there was considerable subglottic swelling (probably due to the previous bronchoscopies) and the pin was found deep in the right lower lobe bronchus.

From the physical signs alone it is not possible in the majority of cases to make a diagnosis of the presence of an ordinary pin in a bronchus or to decide as to its location. With a definite history of aspiration only the affected side can be determined. Without a history of aspiration no suspicion may be aroused, although decreased expansion without any other sign should suggest the possibility. An X ray study gives the diagnosis without difficulty. The time required for the return of normal expansion after the removal of a pin is variable. In one patient the expansion was equal on the two sides within three hours after removal. In other cases a week has elapsed before normal movement was restored. In general it seems that the lower in the bronchus the pin travels, the longer the time required for restoration of the normal expansion.

If the pin has a relatively large head the signs are more marked and more accurate localisation is possible, as is illustrated in the next two cases. In the second one a remarkable shifting of a long pin is shown.

Hat-pin in Left Bronchus.—A child, aged 10 years, was admitted on Feb. 11th, 1922, complaining of slight cough and dyspnœa. On Dec. 30th, 1921, the child took a pin from her clothing and put it in her mouth. Another child slapped her on the back and in throwing her head backward

she aspirated the pin. She states that it went down without any disturbance. An attempt at removal was made elsewhere the same night and two subsequent ones later: all were unsuccessful. The symptoms, even with the repeated bronchoscopies, have been very slight. The patient showed no distress, dyspnœa, or wheeze. Expansion was diminished in the lower left chest. When first examined there was slight relative dullness in the lower left back, which came to about the mid-axillary line. After vigorous breathing this was distinctly less marked. On auscultation very little change was made out, but when the dullness was present at the lower left back the breath sounds were quieter over this area. In the fifth and sixth interspaces, about an inch outside the left nipple line, a moderate number of very fine crackling râles were heard, and over the area of dullness medium crackling râles were heard, mostly with inspiration. The signs suggested that the pin was low down in one of the branches of the lower left lobe bronchus and had a larger head than the ordinary pin. The pin was found in the posterior vertical branch of a posterior subdivision of the left lower lobe. Shortly after removal there was still diminished expansion in the lower left and a few râles were heard. Two days later the difference in expansion was very slight. The X ray study showed practically no change in the lung tissue.

Shawl-pin in Bronchus.—A girl, aged 18 years, came with the history that two days before she had been picking her teeth with a shawl-pin, about two inches long, when it suddenly "went down." She states that it went down easily and she had no coughing or gagging. She is positive that she has not had any symptoms whatever. On examination she had no distress or dyspnœa. There was much less expansion on the right side with slight dullness on percussion over the middle and lower lobes and the breath sounds less well heard over the same area. Not a râle was heard. In the next two days the breath sounds over the lower lobe were less marked. The X ray study showed the pin in the *right* main bronchus, the point being just at the bifurcation of the trachea and the head below the upper lobe bronchus. Before the bronchoscopy was done a fluoroscopic examination was made and the pin was seen to have shifted to the *left* main bronchus. At bronchoscopy (Jackson) the right main bronchus showed the mucosa reddened but without any appreciable swelling. The pin was removed from the left main bronchus. Three days later the expansion was equal, there was slight dullness over the lower right lobe, but the breath sounds were practically normal.

Portions of wire are not common and the following case is of interest:—

Wire in Bronchus.—A child, aged 11 years, came complaining of cough, fever, and dyspnœa on exertion. Two years before she "choked" on a piece of wire shaped like a fish-hook and soon after was in bed for two weeks with a "cold." Slight dyspnœa followed and has existed to the present. A few weeks before admission she ran in a race and became very dyspnœic. On examination the child was well developed and did not have any clubbing of the fingers. There was no wheezing respiration. Expansion was markedly less on the left side. The percussion note did not show any definite change over the fronts, but there was marked dullness over the lower left axilla and back. The breath sounds were somewhat less well heard over the upper left front than over the same area on the right side. In the left axilla and over the lower left back they were very distant. Over a small area near the angle of the scapula they were tubular but heard distantly. On different examinations the breath sounds were found to vary greatly in loudness. Râles were heard on some occasions, but at other times not a single one was noted. The signs suggested that the obstruction was probably due largely to swelling of the mucous membrane and granulations. At bronchoscopy (Jackson) a large mass of granulation tissue was found projecting from the left bronchus and bloody pus came from below. The foreign body was found embedded in the swollen mucosa. After its removal no change was found in the signs except an increased number of râles. Two days later the breath sounds were better heard, but there was little change in expansion or on percussion. Six days later the expansion was decidedly better and the dullness was less. The breath sounds were still distant on quiet breathing, but were well heard on deep breathing.

Tacks, Nails, and Screws.

These gain entrance to the air passages comparatively frequently and usually give a fairly clear-cut picture. The head of a tack enters the bronchus first and passes down until it can travel no farther. The blocking of the bronchus is usually complete, or nearly so, by the object itself, and if any opening remains the resulting swelling of the mucous membrane soon closes it. The signs are those of complete blocking of the bronchus. In a recent case a thumb tack was so placed that the diameter of the head was parallel to the long axis of the bronchus. The only sign was decreased expansion, but as it had only been in the bronchus for one day, very little irritation had been set up. A nail may not block the bronchus itself, and air may pass it, for some time at any rate. Illustrative cases are as follows (see Figs. 2, 3, and 4):—

Tack in Bronchus.—A child, aged 3¼ years, was admitted on Oct. 30th, 1923, with cough and fever. Two days before, while lying on his back on the floor, he had a sudden choking attack and became very blue. The mother did not know of his having anything in the mouth, but later the child said that he had swallowed a tack. Examination showed markedly diminished expansion on the right side, with dullness over the middle and lower lobes. The breath sounds were somewhat decreased over the upper right lobe and very distant over the middle and lower lobes. A few coarse râles were heard. The X ray showed considerable secretion in the middle lobe and less in the lower lobe. The tack was found in the right bronchus. Immediately after removal the dullness was unchanged, but harsh breath sounds were heard everywhere without any râles.

In many of the tack cases the foreign body had been present for a considerable time, and in this event the changes are fairly uniform. There is a rapid formation of pus which may be retained or small amounts may escape occasionally. Changes result in the lung and bronchi, such as abscess, cavity formation, and bronchiectasis. Some degree of fibrosis is common. An illustrative case is the following:—

Tack in Bronchus.—A girl, aged 11 years, was admitted on Jan. 6th, 1923, complaining of cough and fever. In October, 1920, the child had a tack in her mouth. While laughing the tack disappeared, and this was followed by a severe attack of coughing and choking. The child did not tell anyone about this. In December, 1920, the patient had an illness which was diagnosed as broncho-pneumonia, and a second such attack in March, 1921. Since this last attack the cough has been constant. This was dry for a time, but in November, 1922, sputum began to be brought up, a suspicion of lung abscess was aroused, and an X ray examination made, which showed a tack in the right lung. An unsuccessful bronchoscopy was done elsewhere, and a very severe reaction followed this. On examination there was marked limitation of expansion on the right side, especially below, with dullness from about the third rib. Over this area the breath sounds were rather distant and of blowing quality, with many râles of various kinds. The vocal fremitus and voice sounds were distinctly increased. About the angle of the scapula there was an area of whispering pectoriloquy. The breath had a very foul odour. There was no wheeze. A great many râles were heard over the area of dullness and the signs suggested either abscess or bronchiectasis below the foreign body. The X ray study showed the tack in the posterior branch of the furthermost bronchus, head downward, with very marked changes in the lower right and middle lobe. At bronchoscopy (Jackson) the bronchus was found to be narrowed below the middle lobe, and below this it had widened into a cavity deep down in which there was a mass of granulation tissue in which the tack was buried. Within a couple of days there was distinctly more expansion on the right side.

Teeth and Dental Material.

The aspiration of teeth, or portions of teeth, usually occurs when extraction is done under anæsthesia. These cases are not uncommon and their comparative frequency suggests the need of the greatest care by dentists. In some of the cases the dentist was positive that every extracted tooth was safely accounted for, but one was found in a bronchus just the same. Portions of dental material may become loose and be aspirated. In a few cases a small piece of apparatus slipped down while the dentist was at work.

Tooth in Bronchus.—A woman, aged 29 years, was admitted on March 19th, 1923, complaining of cough, much wheezing, and pain in the right chest. On Jan. 5th, 1923, she had some teeth extracted under gas anæsthesia. Immediately after she had a sensation of something having lodged in her throat and wheezing was noted soon after. Cough followed with foul-tasting sputum. A week after the extraction she brought up blood-tinged sputum. The patient showed marked decreased expansion on the right side, especially below. The note over the left lung and upper right lobe was clear; over the middle and lower right lobes there was marked dullness. The breath sounds were well heard over

the upper right lobe accompanied by many musical râles. The signs over the right lobes varied markedly. At one time breath sounds could hardly be heard and again they were present with little alteration. Wheezing and musical râles were always heard. The signs suggested obstruction of the bronchi of the middle and lower lobes which was not complete and varied from time to time. The tooth was found crosswise in the bronchus just below the orifice of the middle lobe bronchus, which was involved by the swelling of the mucosa. After removal the breath sounds were well heard without any râles. In four days the signs were normal. In this case there was no permanent damage and the patient recovered completely.

A woman, aged 20 years, was admitted on April 17th, 1923, complaining of cough and loss of weight. Three months before she had three teeth extracted under gas and immediately after she stated that she had a choking sensation during the extraction and believed that she had swallowed a tooth. This was laughed at and declared to be impossible. Cough came on immediately after and has grown more severe. The sputum has increased in amount and become foul. The patient did not have any dyspnœa or wheeze, but had a very distressing cough. There was less expansion on the left side with a normal percussion note and harsh breath sounds over the upper lobe. Over the lower left lobe there was dullness, with absence of vocal fremitus and breath and voice sounds. The tooth was found blocking the lower lobe bronchus. Immediately after removal there were many coarse râles heard over the lower lobe. She made an excellent recovery.

The next case shows the results of a long sojourn of a tooth in a bronchus.

A man, aged 51 years, was admitted on April 21st, 1919, complaining of cough, foul sputum, and dyspnœa on exertion. On Nov. 29th, 1914, he had two teeth extracted under ether anæsthesia. He noticed nothing of moment until Dec. 8th, 1914, when he was taken ill with "pneumonia," and spent nine weeks in bed. He had high fever (up to 105° F.) and violent cough with large amounts of foul sputum. A negative exploratory puncture was made during the illness apparently under the idea that he had empyema. After 14 weeks he was able to resume his work. Ever since he has had cough with profuse sputum, foul-smelling and sometimes bloody. His general health has been poor and he has been in bed frequently with fever. On examination the fingers and toes showed marked clubbing. The thorax was rounded and showed very little expansion. On deep breathing decreased movement of the lower right side was evident. The left lung was clear. There was dullness over the lower right lobe and the breath sounds had somewhat of a blowing quality. A few râles were heard on quiet breathing, which were louder and coarser on deep breathing. On bronchoscopy there was a stricture found and many fistulæ lined with granulation tissue. These were dilated and explored. On a second bronchoscopy the tooth was found embedded in tissue without any direct opening to it. When grasped by the forceps the tooth crumbled and only a part could be removed. Two subsequent bronchoscopies were required to remove all the fragments.

Nuts, Grains of Corn, and Vegetable Material.

These organic substances form a most important group as there is always great danger of death resulting in a short time from toxæmia and septic infection, especially in young children. In the United States the peanut is the most common member of this group to be aspirated. It is a common article of diet, and judging from our experience is frequently given to young children either as the nut itself or in the form of candy containing peanuts. In many cases the child is unable to chew the nut and endeavours to swallow a fairly large portion; choking results and the nut is aspirated. To the resulting condition Jackson and Spencer[2] gave the name arachidic bronchitis. It is worthy of discussion in some detail.

Arachidic Bronchitis.—Age is an important factor as the cases are almost always in children and frequently in those below the age of two years. Dr. Jackson has had only one case in an adult and he was a physician. The severity of the resulting symptoms varies with the age; the younger the child, the more severe and dangerous they are. The condition produced is a very remarkable one. There is a most acute œdematous laryngo-tracheo-bronchitis with the formation of thick pus. The rapidity of development of the inflammatory process is remarkable. It may be marked in a few hours. The purulent secretion forms very rapidly, is often extremely profuse, and in some cases is most tenacious, so that moulds of the bronchi form, much like those occurring in fibrinous bronchitis. The process is most marked about the site of the nut or grain, but tends to spread upwards if the nut is in a lower lobe bronchus so that the whole bronchial tree is involved. The bronchi of the other lung also become involved to some extent. The cause of this intense irritation is not clear. Two globulins are found in the peanut, arachin and conarachin, and it has been suggested that these may contain some special irritant.

The effects produced are very striking. There is evidence of severe infection, shown by fever, which is often high, leucocytosis, and severe toxæmia. This latter is usually marked and the picture is sometimes not unlike that seen in malignant diphtheria. Death may follow in a short time if the nut is not removed. Jackson mentions that death occurred in two weeks in three patients in whom bronchoscopy was not allowed. The extreme dyspnœa with infection and toxæmia rapidly exhausts the patients. Striking features are the rapid pulse- and respiration-rates, which remain fairly constant despite variations in the temperature. If the peanut remains for a few days there is the accumulation of enormous amounts of pus below it and the rapid formation of one, or usually many, abscess cavities.

The clinical picture is usually a remarkable one, and the younger the patient the more acute the symptoms. There is great dyspnœa and restlessness with marked cyanosis. There is toxæmia from the septic infection and asphyxiation from the obstruction due to the secretion and swelling of the mucous membrane. In some patients the cyanosis is succeeded by pallor which may be deceptive, for instead of being a sign of improvement it means exhaustion and the approach of death. Cough is frequent and paroxysmal; sometimes a pink purulent sputum is brought up; often nothing can be dislodged. The "asthmatoid wheeze" is frequently present. A point of importance is that the voice is rarely lost. With the marked dyspnœa and asphyxiation the picture is a most distressing one, and much like that of laryngeal diphtheria. The usual signs of obstruction to inspiration are well marked. The physical findings are shown by the report of some cases.

Peanut in Bronchus.—A child, aged 22 months, was admitted on Nov. 6th, 1923, with a history that at 8 A.M. on the day of admission she was eating peanuts. Suddenly she began to cough and became red in the face; wheezing respiration was noted immediately. On admission the child was very restless, cyanotic, and dyspnœic. There was a distinct wheeze with convulsive attacks of coughing. The left side was distended and showed absence of expansion. The note over the left side had a tympanitic quality with absence of the breath sounds. The X ray study showed marked *obstructive* emphysema of the left lung. Bronchoscopy was done the same day and the trachea and both bronchial orifices were intensely red and inflamed. The peanut was removed from the left bronchus a little over eight hours from the time of aspiration. The child did not improve and continued to have fever with signs suggesting the presence of secretion in the lower lobes. Death occurred on Dec. 8th. At autopsy there was marked inflammation in the trachea and bronchi, the mucosa being covered by purulent material. On the right side there was considerable suppuration. Death was apparently due to septic infection.

This case shows the serious results which may follow the aspiration of a nut. The foreign body was removed after being eight hours in the bronchus, but the infectious process set up by it progressed until death resulted. The rapid development of the inflammatory process is to be noted. It suggests an action like that due to an irritant gas. The condition illustrates the *ball-valve action* of a foreign body; air was allowed to pass into the left lung but could not get out. It is very easy in such cases to mistake the affected side unless a careful examination is made. In the next case there was not complete blocking of the bronchus and air could pass in and out.

[2] Jour. Amer. Med. Assn., 1919, lxxiii, 672.

Peanut in Bronchus.—A child, aged 2 years, was admitted on Jan. 25th, 1923, with strangling cough and wheezing respiration. On the previous day, while eating peanuts, the child began to cry and there was an attack of strangling and dyspnœa. There was a loud wheeze both with inspiration and expiration and some dyspnœa, but no marked cyanosis. The expansion was decreased on the right side. The left side showed hyper-resonance with harsh breath sounds. Over the right side the note generally had a tympanitic quality with some dullness over the lower back. The breath sounds varied greatly. At times both inspiration and expiration could be heard, accompanied by very curious high-pitched whistling and wheezing râles. The heart was displaced to the left. The signs suggested that the peanut was in the right main bronchus, but was not causing complete obstruction. Bronchoscopy was done at once. There was marked swelling of the subglottic tissues with considerable pus in the trachea and bronchi. The peanut was removed from the right main bronchus. Tracheotomy had to be done subsequently and then followed a struggle for the life of the child which required frequent bronchoscopies, an average of three or four a day for some days, because large crusts formed in the bronchi. These caused marked obstruction and at times air was prevented from entering a whole lung or a lobe by them. On one occasion the child stopped breathing, but fortunately it was possible to remove a large cast of a bronchus at once. Constant aspiration of the trachea had to be done. The condition gradually improved and the child was discharged well on March 15th. Only the repeated bronchoscopies with the removal of the material in the bronchi saved the child's life, as the cough reflex seemed to be completely abolished.

Here, again, the remarkable rapidity of the process is shown. Within about 24 hours after aspiration large amounts of pus had formed. The persistent formation of the "crusts" in the bronchi was an unusual feature.

A very striking feature of the foreign bodies belonging to the vegetable kingdom is the rapidity with which acute inflammatory changes are produced. This is especially true of the peanut, but applies also to other vegetable substances. Beans and grains of corn are not infrequently aspirated, and the following cases illustrate the rapidity with which inflammatory changes follow :—

Corn in Bronchus.—A child, aged 14 months, was admitted on Feb. 25th, 1923, with the history that on the day of admission she was playing with grains of corn (maize) and suddenly began to choke and cough, at the same time becoming very blue. A few hours later she showed great distress, cyanosis, marked inspiratory dyspnœa, cough, and a loud wheeze. At times with the cough there was a distinct slap which could be heard and felt over the larynx. There was well-marked inspiratory retraction both above the sternum and clavicles and in the epigastrium. Expansion seemed equal as a rule, but occasionally one side was limited. Percussion was resonant throughout, and on auscultation the breath sounds were rough and harsh with an occasional shutting off of all breath sounds. Coarse râles were heard on both sides. The diagnosis was made of a foreign body in the trachea which occasionally passed temporarily into a main bronchus. Bronchoscopy was done promptly; very marked swelling of the larynx and subglottic tissues was found, with marked inflammation of the tracheal mucosa and considerable secretion. The grain of corn was found to be shifting about and was finally removed from the right bronchus. Tracheotomy had to be done subsequently on account of the laryngeal obstruction; the child made a good recovery.

Bean in Bronchus.—A child, aged 13 months, was admitted on March 20th, 1923, with a history of playing with beans the day before. She suddenly coughed and choked, and when the mother ran to her the child had great dyspnœa and wheezing respiration. On examination the child was very ill, had marked dyspnœa, and a well-marked asthmatoid wheeze. The signs were much as in the previous case. Bronchoscopy was done at once and marked inflammation and considerable secretion found. The bean was found at the bifurcation of the trachea partially in the right bronchus.

Particular emphasis should be placed on the *acuteness* of the symptoms. Within a few hours the child may be in danger of death. In the cases quoted death would have followed very shortly unless the foreign body had been removed. There is no reason to suppose that such cases are only of recent occurrence, and there are no statistics which show the number of deaths from this cause. It must not be supposed that all cases are as acute as those quoted. In older children the picture is much less acute. There must be a great difference in the individual reaction or in the amount of irritation set up by the vegetable substance. This is shown in the following case :—

Peanut in Bronchus.—A child, aged 2½ years, was admitted on June 15th, 1923, with a history of having been eating candy which contained peanuts on June 4th, 1923. A portion was aspirated and following an attack of choking there were cough and distress. The signs showed the nut to be in the left lower lobe bronchus and that the blocking was not complete as the amount of air in the lobe varied from day to day. At bronchoscopy (Jackson) there was a great deal of swelling of the mucous membrane and granulation tissue in the lower left lobe bronchus. Recovery was rapid, and a week after removal the expansion was equal on the two sides.

Miscellaneous Objects.

There are many curious objects which gain entrance to the bronchi, only a few of which can be noted. Fig. 5 shows a broken tracheotomy tube impacted in the left bronchus.

Portion of Rubber in Bronchus.—A boy, aged 5 years, was admitted on Sept. 29th, 1923, complaining of constant wheezing which was greatly increased during sleep. About three weeks before the child was playing with a piece of rubber and suddenly began to cough, saying that the rubber had gone down his throat. Wheezing was noted at once and has continued. The child was not dyspnœic or cyanotic. The wheezing sound was heard occasionally. Inspection showed decreased expansion over the lower right thorax. The note over the upper left lung was slightly hyper-resonant; over the lower left lung there was slight dullness. There was dullness over the lower right lobe more than on the left side. The breath sounds were generally harsh with coarse râles over the lower left lung. Over the lower right lung the breath sounds were distant and accompanied by coarse, gurgling râles. The signs varied from day to day and were puzzling. We regarded the foreign body as being in the lower right lobe and the signs on the left side as due to secretion which had passed over from the right side. Repeated X ray studies were negative at first, but later the right diaphragm moved less and peribronchial thickening became more marked on the right side. Later there was increased density in the lower right lobe. The first bronchoscopy (Jackson) on Oct. 3rd showed inflammation of the right bronchus with many granulations and some muco-pus. A foreign body was not seen. After this tracheotomy had to be done. At a second bronchoscopy on Oct. 31st, after inspiration of pus and removal of granulations, a small black object was seen which after removal was found to be a piece of rubber. Recovery was rapid; the breath sounds soon were heard over the lower right lobe, and the child was discharged well.

In this case the diagnosis was only reached after repeated examinations and after the signs in the lower right lobe became more definite. The collection of secretion in the lower part of the opposite lung may be a source of great difficulty, as in this case.

Cork in Bronchus.—The patient, aged 19 years, was admitted on March 8th, 1923, complaining of cough, wheezing respiration, and attacks of cyanosis. On Feb. 12th, 1923, she had a small piece of cork in her mouth about the size of the rubber on the end of a pencil. She laughed and the cork was aspirated. Cough followed at once and has continued with wheezing respiration. A few days later she was supposed to have pneumonia. On admission she had very severe cough and marked wheezing, but not marked dyspnœa. Expansion was less on the right side, especially below. There was some dullness over the middle right lobe and marked dullness over the lower lobe, except for an area of resonance over the lower right back. Vocal fremitus was decreased over the lower lobe. The breath sounds were heard but diminished over the middle lobe. On quiet breathing no breath sounds were heard over the lower right lobe, but on deep breathing they were heard with a number of squeaky râles. Over the upper right lobe there were normal resonance and breath sounds with occasional râles. The X ray study showed marked changes over the lower right lobe. At bronchoscopy (Jackson) the cork was found in the lower lobe bronchus completely surrounded by granulation tissue, which extended up to the orifice of the middle lobe bronchus.

This case illustrates the relationship between the local conditions in the bronchus and the physical signs. The absence of breath sounds on quiet breathing and their presence on deep breathing suggests the presence of granulations which usually extend above the foreign body. The extra effort of deep respiration is sufficient to overcome the obstruction. Signs which are much

less marked in a higher lobe, as in this case, suggest granulations which partially obstruct the higher bronchus. The finding of some resonance, often tympany, in the lower back when there is considerable blocking of the lower lobe bronchus is common. The note between the scapular line and the spine may show some resonance—often a combination of tympany and dullness—while from the scapular line to the axilla and in the axilla there is flatness.

Piece of Tin in Bronchus.—A child, aged 11 years, was admitted on Dec. 19th, 1923, with the statement that he had a piece of tin in a bronchus. On Dec. 2nd, 1923, he picked up a piece of tin and put it in his mouth. He laughed and the tin disappeared. For a few days he had a croupy cough which did not continue. Five unsuccessful attempts at removal had been made elsewhere. The child did not have any cough, dyspnœa, or wheezing. There was less expansion on the right side with dullness over the lower lobe, which was least marked between the scapular line and the spine at the base. Vocal fremitus was absent over the lower lobe. Breath sounds were heard distantly over the lower lobe on deep breathing. The signs varied from day to day, and at times over the middle lobe there was some dullness and decreased breath sounds. At bronchoscopy (Jackson) the object was found deep in a lower lobe bronchus. Removal was difficult as a sharp, thin edge at one end had made a cavity by ulceration. Recovery was rapid and he was discharged with normal findings in the lung.

Top of Pencil in Bronchus.—A boy, aged 6 years, was admitted on March 16th, 1920, complaining of cough and dyspnœa. On March 13th, 1920, while holding the metal top of a pencil in his mouth, he fell and the object disappeared. The child choked and strangled for a time afterwards. Dyspnœa and paroxysmal cough followed. The child was very ill and extremely dyspnœic and cyanotic. There was absence of movement of the left side of the chest and the heart was displaced far to the left. There was dullness throughout the left lung, which was less marked over the upper lobe. The breath sounds were heard, intensely tubular with a few râles, over the upper left lobe; they were absent over the greater part of the lower left lobe, where no râles were heard. Over the lower left back very distant blowing breathing was heard. The X ray showed a dense shadow over the whole of the left lung with the heart displaced to the left. There was evidently collapse of the left lung. At bronchoscopy the body was found in the left lower lobe bronchus, the upper edge almost occluding the orifice of the upper lobe bronchus. It was very tightly impacted. The child was examined at once after the removal of the foreign body. There was resonance throughout the left side with a tympanitic quality. Breath sounds were heard everywhere, over the upper lobe slightly harsh and over the lower lobe harsher than normal and with many coarse bubbling râles. The recovery was rapid.

The rapid change in the breath sounds after removal of the foreign body is of interest. Within two minutes the intense tubular breathing over the upper left lobe was replaced by vesicular breath sounds only slightly harsher than normal. The difference in signs over the upper and lower left lobes is puzzling, as both seemed to be affected. This is noted not infrequently when the foreign body is so situated that it obstructs the lower lobe bronchus completely and the upper lobe bronchus partially. In this case the tubular breathing over the upper lobe might naturally have suggested pneumonia.

CASES OF LONG DURATION.

These are interesting as demonstrations of how tolerant the lung can be of a foreign body. The longest period in Dr. Jackson's series is 36 years (two cases). The foreign body is usually in a lower lobe bronchus and marked changes are always present. Abscess formation, bronchiectasis, and fibroid changes are to be expected. The clinical picture is due to these and does not offer anything peculiar. The general health suffers as from any long-continued lung suppuration, and clubbing of the fingers and toes is common. In some of the patients a diagnosis of tuberculosis is made for which there is little, if any, excuse. In some an X ray study done by a physician newly consulted has given the diagnosis. The following case illustrates many of the features:—

Nail in Bronchus.—A boy, aged 12 years, was admitted on Nov. 27th, 1922, complaining of wheezing respiration and occasional cough. On Sept. 20th, 1912, he had a number of shingle nails in the mouth and in falling aspirated one of them. No clear account of the following symptoms could be obtained. In November, 1912, he was supposed to have an attack of pneumonia and several illnesses since then were also diagnosed as pneumonia. He has had wheezing respiration since the aspiration and some cough, always worse on violent exertion. An X ray plate was taken after many years of symptoms and the presence of the nail discovered. Six unsuccessful attempts at bronchoscopy had been made elsewhere. The boy was well nourished and did not show any dyspnœa or wheeze when quiet. The sputum was profuse and foul. Expansion was almost entirely absent over the left side except at the apex. Vocal fremitus was present over the upper lobe and absent over the lower lobe. There was dullness over the left side, more marked and with greater resistance over the lower lobe. Over the upper lobe the breath sounds were harsh with prolonged expiration and an extraordinary number of râles. Over the lower lobe the breath sounds were hardly heard, but there were a large number of râles. The heart was displaced to the left. The X ray study showed an apparent absence of normal lung tissue in the left side and many cavities. The nail was found in abnormal tissue. The cough and sputum decreased greatly, but the signs in the lung did not alter materially.

COMPLICATIONS.

Considering the severity of the symptoms in many of the cases and the long duration of bronchial infection these are relatively few. Abscess and bronchiectasis may be regarded more as sequels than as complications. They offer no special peculiarity and have much the same features as when they occur from other causes. The formation of a bronchial stricture is not uncommon. This may interfere with drainage and add to the difficulty of removal of the foreign body. The long-continued suppuration may be accompanied by disturbance of the general health and clubbing of the fingers.

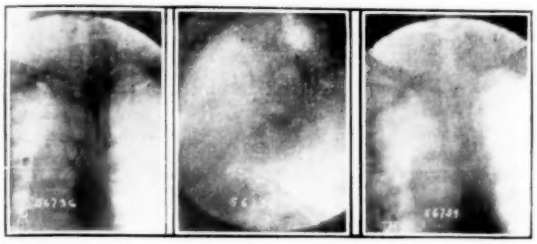
Pneumothorax.—This usually occurs in very acute cases in which presumably there is rupture of an air vesicle from the severe paroxysms of coughing. Its occurrence adds to the severity of the dyspnœa and complicates the diagnosis, difficulty in which evidently occurs particularly in non-opaque foreign bodies. Careful judgment is necessary to decide when bronchoscopy should be done if it seems justified for diagnosis or is indicated for removal of a diagnosed foreign body. Constant watch should be kept to recognise the presence of pyo-pneumothorax. It is evident that no rules can be given as to diagnosis in these cases, and in the absence of any suggestive history of aspiration of a foreign body it may be very difficult. The X ray study is definite in the case of an opaque foreign body. An escape of air into the mediastinal tissues is not very uncommon and does not appear to be of serious import.

Empyema.—This is rare but has occurred in a few cases with a long sojourn of the foreign body in bronchus and abscess formation. The supposition is that infection of the pleura occurs by extension from the lung. The recognition of this complication is usually not difficult by the physical signs, and if necessary aspiration removes any doubt. A difficulty is in the decision whether the foreign body should be removed before draining the empyema. As these patients are usually very toxic and seriously ill, our usual practice has been to drain the empyema first. An illustrative case is as follows:—

A boy, aged 8 years, was admitted on Dec. 5th, 1923, complaining of cough. Six years before he was running while holding a small staple in his mouth. In some way he aspirated the staple. The physicians who saw him made a diagnosis of diphtheria and his breathing became so difficult that tracheotomy was done. After two weeks the acute features disappeared, but some dyspnœa remained and cough has continued to the present. In the past year the child has been losing weight. Finally, an X ray plate was taken, which showed the foreign body. (Fig. 6.) The child was very ill on admission, emaciated, and anæmic. He had a hoarse cough but no wheeze. The left chest showed absence of expansion and flatness over the lower part with dullness above. There was marked resistance over the lower part. The breath sounds were not heard. The right side was hyper-resonant and the breath sounds were harsh. The heart was displaced to the right. The X ray study showed a staple in the left bronchus and a thick shadow throughout. By an exploratory puncture thick pus was obtained. There was an irregular temperature curve, the maximum being

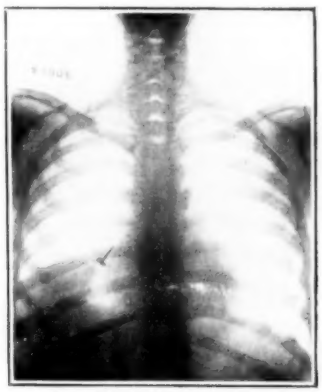
PROF. T. McCRAE: FOREIGN BODIES IN THE BRONCHI

FIG. 1.



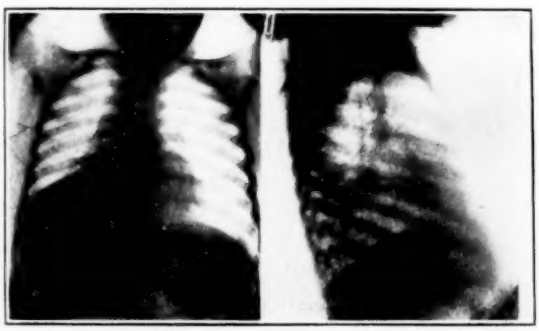
Safety-pin in bronchus.

FIG. 4.



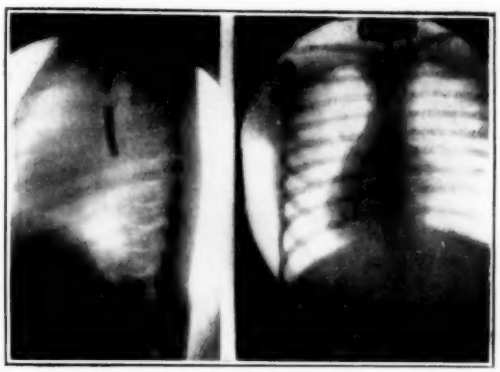
Tack in right lower lobe bronchus causing complete obstruction. The signs disappeared rapidly after removal.

FIG. 2.



Nail with the head up, which is unusual. Marked changes in the lower right lobe.

FIG. 5.

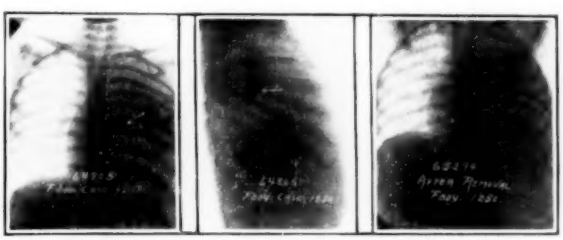


Portion of broken tracheotomy tube with the greater part in the left bronchus but the upper end in the trachea. It had been present for two days. Expansion was diminished on the left side with marked changes on auscultation but not on percussion.

FIG. 3.

Tack in right lower lobe bronchus for one month. Patient aged 5 years. Much pus and many granulations were found.

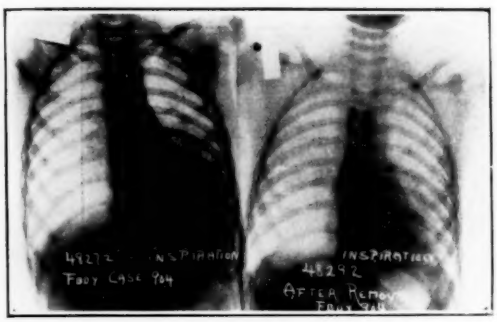
FIG. 6.



Staple in left bronchus for six years. Empyema.

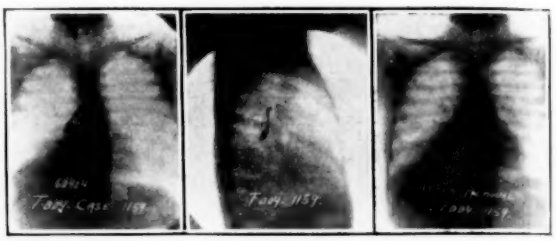
PROF. McCRAE: FOREIGN BODIES IN THE BRONCHI.

FIG. 7.



Peanut case showing difference in the amount of air in the lungs and displacement of the heart.

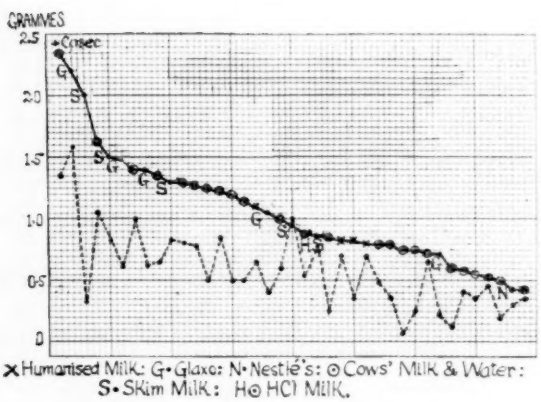
FIG. 8.



Part of a metallic toy. Child aged 6 years. The foreign body had been present for seven days. There were marked signs over the lower right lobe. Within two days after removal the signs had disappeared.

DR. L. G. PARSONS: WASTING DISORDERS OF EARLY INFANCY.

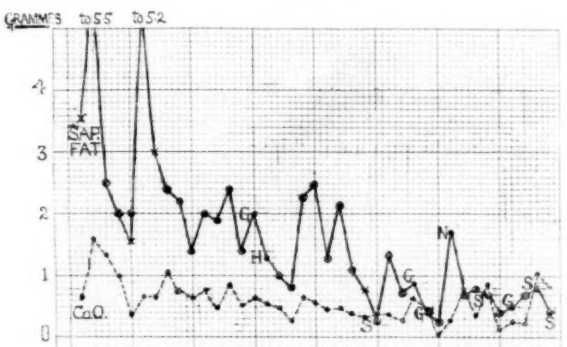
CHART 1.



×Humanised Milk: G·Glaxo: N·Nestlé's: ⊙Cows' Milk & Water: S·Skim Milk: H⊙HCl Milk.

Calcium (CaO) intake and output in grammes per 24 hours.

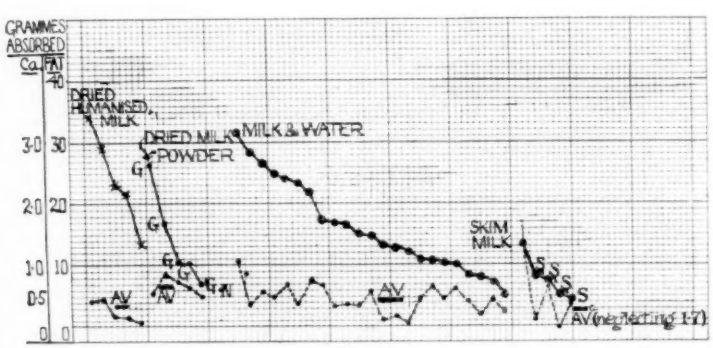
CHART 3.



×Humanised Milk: G·Glaxo: N·Nestlé's: ⊙Milk & Water: S⊙ Skim Milk: H⊙ HCl Milk.

Relation between calcium output (grammes per 24 hours) and saponified fat output (grammes per 24 hours) for various fat intakes.

CHART 2.



Relation between weight of calcium absorbed and weight of fat absorbed. Av. = average. Other references as in Chart 1.

103° to 104° F. It was decided to drain the empyema first, and this was done. The child did very well and improved steadily. On Dec. 5th the foreign body was removed. The left bronchus contained many granulations. The child was discharged on Dec. 22nd greatly improved, but with signs of extensive change in the left lung and thickening of the pleura.

Hæmorrhage.—Small amounts of blood may be brought up soon after the aspiration, but profuse bleeding usually occurs after a long sojourn of the foreign body in the lung. An object with a sharp edge may erode the mucous membrane and bleeding occurs from the ulcer produced. With abscess or bronchiectasis the hæmorrhage may be in large amounts and death may result from it. In one patient admitted to my service a scarf-pin had been in the lung for 36 years and a squamous-celled carcinoma developed. The foreign body was recognised and bronchoscopy done, much foul pus being removed, but the bronchoscopy was not prolonged on account of her condition. She died four days later from a profuse hæmorrhage. The case has been reported by Weiss and Krusen.[3]

Goulstonian Lectures

ON SOME

WASTING DISORDERS OF EARLY INFANCY.

Delivered before the Royal College of Physicians of London

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(*With Charts on Plate.*)

LECTURE II.

Delivered on March 27th.

IT is frequently found that atrophic children do extremely well for a time when fed on a low fat dietary—e.g., skimmed milk or a mixture of whole and skimmed milk—particularly if there has been diarrhœa. If these cases are followed up, after a time the gains become less; later the weight curve becomes horizontal, or even shows a downward tendency. If, however, the fat content of the food is increased, the weight curve ascends again. These facts are, of course, exactly parallelled by well-known experimental results. Thus, if a diet lacking in vitamin A is given to young growing rats, growth, under favourable conditions, may continue at a nearly normal rate, due presumably to using surplus vitamin A in the body, until the supply is exhausted, when growth slackens and usually ceases. Often a rather rapid loss of weight begins shortly afterwards, and the animal goes into a condition of general decline, leading to death. If vitamin A is given growth is renewed. In milk vitamin A is divided about equally between the fat globules and the aqueous part; in other words, skimmed milk contains only about one-half the vitamin A present in whole milk (McCollum).[1]

RECENT EXPERIMENTAL FINDINGS ON VITAMIN-A DEFICIENCY.

Some further experimental findings on vitamin-A deficiency, which may prove to be of importance in infantile atrophy, have recently been published. By feeding young rats on a diet deficient in vitamin A, Cramer[2] found that atrophy of the intestinal mucous membrane occurred, with an increase in bacterial content of the intestine, and evidence of the invasion of the villi with bacteria. Gross[3] found that when adult rats were fed on such a diet, there was a marked acceleration of the passage of food through the alimentary canal. The latter observation may help to explain the clinical fact to which I have already drawn attention, that in some atrophic infants the passage of food through the alimentary tract is much more rapid than in others. Increase in bacterial content of the intestine also occurs in atrophic children under certain conditions, but up to the present there has been no real evidence of the occurrence of atrophy and consequent loss of absorptive power of the int s-tinal mucous membrane. Gross did not find any intestinal atrophy in his animals, but it is probably unfair to compare the two sets of experiments, for in one the deficient diet was kept up for a longer period and young rats were used, whereas in the other the animals were adults.

Following the important observation of Gowland Hopkins[4] that oxidation destroys fat-soluble A, McCollum, Simmonds, Becker and Shipley[5] have found that it is possible to prove the presence of two substances in certain food fats. One of these is fat-soluble A, and the other, a substance which regulates calcium metabolism. Butter fat is a better source of the fat-soluble A than of the other substance, whereas cod-liver oil is a good source of both. They discuss the possibility of both these substances being actually two properties of one and the same substance, but their view is quite definitely that there are two distinct substances, "a special calcium depositing vitamin which is often associated with fat-soluble A, but is distinct from it." They demonstrated the absence of fat-soluble A in the food fat by its inability to effect a cure of xerophthalmia when given to animals in which this condition had been experimentally produced; and the absence of the calcium depositing vitamin, by the inability of the food fat to produce a "white line" in X ray negatives, when given to rats previously rendered rachitic by dieting. The "white line" is a line of deposition of calcium salts running transversely across the cartilage, which is produced when food containing fat-soluble A in any quantity, and, according to these researches, the calcium containing vitamin also is suddenly introduced into the diet of a rachitic rat. These observations, which have been confirmed by Steenbock, Hart, Jones, and Black,[3,5] are of considerable importance with regard to the rôle of fats in infantile atrophy and infant feeding generally.

The condition of xerophthalmia is very rarely seen in the children's clinics of this country. During the last 13 years there have been only 13 cases of the mild form of xerophthalmia—i.e., xerosis of the conjunctiva—seen at the Birmingham and Midland Eye Hospital, and not one case of the severe form of the disease keratomalacia. On the continent, and particularly in Denmark, during the period of the war the disease has been observed much more frequently. Bloch[6] tells us that although he had seen xerophthalmia in Denmark from 1912 onwards, during the war the number was greatly increased. Denmark is a dairy-farming country which manufactures and exports butter. During the war, owing to the blockade, the prices of butter and fresh milk rose so high that the poor could scarcely procure either of them. Buttermilk and separated milk could, however, always be obtained at a low price, and were therefore largely used for the artificial feeding of infants. In some cases an excess of carbohydrate food was given, either alone, or in combination with separated milk. As a result of these methods of feeding, Bloch was able to recog nise two groups of cases, in both of which xeroph thalmia occurred. He labelled these dystrophia alipogenetica and dystrophia amylogenetica, respectively. To the latter group of cases I will refer later. In dystrophia alipogenetica the growth of the child stopped, there was some wasting, and xerophthalmia developed. The proof that these symptoms were due to the absence of fat containing fat-soluble A occurred when the Danish Government took over the control of butter and rationed it, allowing 250 g. weekly to each adult and child. Xerophthalmia ceased simultaneously. The rationing of butter came to an end

[3] Jour. Amer Med. Assn., 1922, lxxviii., 506.

after the termination of the war and xerophthalmia recurred, but its occurrence was rare in comparison with the war period, and the severe cases were no longer seen. In Germany during the war xerophthalmia was scarcely ever seen, due to the fact that all the milk and milk products were rationed, so that every little child obtained a certain amount daily, or if the child was breast-fed, the mother was allowed the milk. Bloch made an observation which is of considerable interest in the light of the experiments of McCollum and his co-workers—namely, that xerophthalmia and rickets were very rarely met with in the same child.

CALCIUM METABOLISM IN ATROPHY.

The literature on the subject of calcium metabolism, and its relation to fat is very extensive, and many diverse views are expressed. Some believe that a high fat intake results in a large fat excretion, accompanied by a serious loss of bases, especially calcium (Czerny). Others believe that a liberal intake of calcium, which is frequent in children fed on cows' milk, results in an excessive excretion of calcium, which is accompanied by a harmful loss of fat; or the excess may be "ingested, entering the body fluids and tissues in organic combination and perhaps subsequently setting up a toxic condition."[7] Others again (Holt) say that there is no evidence of these results, and believe that an ample intake of both fat and calcium produces only beneficial results.

With the exception of Utheim's[8] series of 17 cases, I know of no extended observations on calcium metabolism in infantile atrophy. In 39 of my cases in which fat estimations of the stool were done, observations on calcium metabolism were also made. The stools were ashed, and calcium was determined in the weighed ash by the McCrudden[9] method. This is the method used by Utheim and also by Holt, Courtney, and Fales, who investigated the calcium metabolism in a series of normal children, children suffering from diarrhœa, and children suffering from rickets. According to the latter workers, calcium metabolism results are only truly comparable when the same methods are used.

Calcium has not been estimated in the urine, so that the observations do not give absolutely definite "balance" figures, but all observers agree that the amount excreted in the urine is very small (less than 4 per cent. according to Findlay, Paton, and Sharpe[10]), and the omission of urinary calcium does not therefore affect the figures very much. From our observations we have found that calcium output varies fairly closely with the weight of the dried fæces; this is so not only when comparing different children, but also in the daily variations of calcium output and fæcal weight in the same child. From a consideration of Chart 1 (see plate) it will be seen that the curve of the output of calcium follows the curve of the intake, but only in a very general fashion, and that there are many exceptions. I would draw attention to the occurrence in one case of an output greater than intake (negative balance), and to at least four other cases in which the output closely approximates to the intake. The output of calcium follows more closely the intake of fat than the intake of calcium, provided that the fat intake is not less than 12 g. daily. When the fat intake is less than 12 g. daily, the calcium output shows no constant relationship to it, indeed, in several cases the calcium output is relatively and absolutely greater than in many cases having a higher fat intake.

The best absorption percentages were found when the fat intake was more than 2·5 g. per kg. of body-weight, and more than 0·19 g. of calcium per kg. of body-weight.

A comparison of different methods of feeding, to determine their calcium value to the atrophic child, is of interest. From Chart 2 it is seen that a variety of dried cows' milk made by the roller process shows a high amount of calcium absorbed, whereas a dried humanised milk, prepared by the spray method, shows a much lower amount absorbed. The ordinary cows' milk mixtures give an intermediate value. The possibility of the endogenous origin of some of the calcium in the fæces must, however, be borne in mind in assessing the value of these results, although the actual amount of the calcium intake in these feeds does vary in a similar fashion.

The actual figures obtained by us, and how they compare with those of other observers, can be seen from the table.

—	Holt, Courtney, and Fales: Bottle-fed infants, not atrophic.	Utheim: Atrophic infants.	Parsons and Hickmans: Atrophic infants.
	30 cases, ages 2–16 mos.	28 obs., 17 cases, 3 wks.–14 mos.	39 cases, to 6 mos.
Average absorption of CaO per kg. of body-weight.			
Average .	0·081 g.	0·067 g.	0·121 g.
Range ..	−0·064 to 0·133	−0·48 to 0·309	−0·02 to 0·335
Percentage absorption of CaO.			
Average .	37·2%	24·9%	43·3%
Range ..	0 to 66·7%	0 to 68·5%	0 to 87·8%
Daily total excretion of CaO.			
Average .	0·75 g.	0·71 g.	0·59 g.
Range ..	0·34 to 1·58 g.	0·125 to 2·136 g.	0·09 to 1·60 g.

Prior to Holt's paper, the recorded observations on calcium metabolism showed very much lower values for the absorption per kg. of body-weight, the actual figures for children under six months fed on cows' milk being 0·002 g. to 0·06 g. It is possible that differences in the method of estimating calcium may account for this. The figures, however, in the above table are all strictly comparable, since the same methods were used in each series of cases. Findlay, Paton, and Sharpe[10] state that infants under one year absorb 35 per cent. of the calcium intake. This value is, however, based on three cases only, the youngest being aged 6½ months. This child is the only one comparable with my cases, and it showed an absorption of 0·178 g. of calcium oxide per kg. of body-weight, or 56·4 per cent. of the intake.

By means of Chart 3 (see plate) I have compared the calcium output with the amounts of soaps found in dried fæces, from which it is evident that there is no definite parallelism between the excretion of calcium and the excretion of soap, although the curve of calcium excretion does rise with the highest readings for soap. In four instances it is interesting to note that the amount of calcium found in the fæces is greater than the amount of soap; this is probably due to the presence of calcium phosphate and calcium carbonate. These cases occurred in children who were on a very low fat diet, and the relatively high excretion of calcium may possibly be associated with the absence of a calcium depositing vitamin.

The amount of calcium lost as soap does not usually form a large proportion of the calcium intake; indeed, it has been stated that it probably does not amount to 30 per cent. (Holt). In our cases the average has been even less—namely, 17 per cent.—but one case showed the high figure of 65 per cent., and in this instance once again the baby was receiving a high fat content dried milk. The influence of calcium soaps on the daily fæcal weight is, according to Telfer,[11] considerable; this is so, not because of their own weight, but because they apparently have the property of occluding or incorporating the constituents of the intestinal contents in amounts proportional to their mass. This observer also states that he was unable to find any evidence of an appreciable degree of endogenous calcium in the fæces; Hamilton,[12] on the other hand, in a recent paper on the calcium metabolism of premature infants, advances the view that "probably the calcium soaps present in the fæces are to be regarded as a secondary product after the calcium has passed through the internal metabolism, when it is excreted into the intestine." The existence of a negative calcium balance, found by us in one case, and also by other observers, is difficult to explain in the absence of endogenous calcium in the fæces. The

finding of low retention values for calcium, when the intake of calcium and fat is sufficient, also suggests the probability of the presence of endogenous calcium in the fæces.

Our results, therefore, show that many atrophic children can absorb calcium as well as normal children; and, indeed, that, as with fat, many are actually able to absorb larger amounts per kg. of body-weight than the amount usually absorbed by the atrophic child. These experimental results support the view that in atrophy an ample intake of fat and calcium produces only beneficial results, and that if feeds low in fat, or low in calcium, are given over a long period of time, the calcium retention may reach a dangerously low level. They also show that in atrophy low retention values and even a negative calcium balance may occur.

THE METABOLISM OF CARBOHYDRATES IN ATROPHY AND CARBOHYDRATE INDIGESTION.

In my first lecture I quoted Finkelstein's views on the harmfulness of lactose, and gave an account of the criticisms advanced against this view; actually in more recent years he has retreated somewhat from his original position, and has stated that considerable quantities of carbohydrate can be added to protein milk. I have also referred to the fact that, during the war period, Bloch[6] was able to separate a group of cases to which he gave the name dystrophia amylogenetica, and which are due to the giving of food containing an excess of carbohydrate, but showing an almost complete absence of fat. These cases presented the picture of Mehlnährschaden, the tissues of the child were œdematous, there was marked hypertonicity, as evidenced by the hands taking up the position known as "paw-hand" and by rigidity of the neck, xerophthalmia developed, and the children became very susceptible to infection. Later the dystrophy passed on to actual atrophy. Bloch thinks that the atrophic form is more likely to occur when new-born and delicate babies are fed for a long time on this type of food, whereas the hydræmic form is more likely to occur if the child is a few months old, and particularly if it was a strong child when the excessive carbohydrate feeding was started.

Photographs of these children show that the picture of carbohydrate atrophy is, with the exception of the state of the eyes, similar to that of the wasted hypertonic infant not infrequently seen in this country, even when there has not been excessive carbohydrate feeding. The picture of carbohydrate dystrophy shows œdema similar to, but more marked than, that which is also seen in this country characteristically associated with high carbohydrate feeding. Œdema, however, does occur apart from this form of diet, and for which there does not appear any obvious explanation, unless, indeed, it bears some relationship to the varying salt content of the whey as suggested by Finkelstein.

The blood-sugar of atrophic children has been shown by several investigators to be below normal; this also obtains in pyloric stenosis when wasting has occurred, as demonstrated by Barling and myself.[13] The sugar tolerance (the metabolic tolerance for sugar) of atrophic infants is very high (Helmholz and Sauer[14]); by giving a continuous intravenous injection of dextrose at the rate of 25 to 50 c.cm. per hour, Matill, Mayer, and Sauer[15] found that the tolerance of normal children is practically that of adults—namely, 0·8 to 0·9 g. of dextrose per kg. of body-weight per hour; whereas that of atrophic infants is considerably greater—namely, 1·4 to 1·8 g. per kg. per hour. Fleming[16] gave glucose by the mouth to atrophic infants and found that 3·0 g., in one case even 6·6 g. per kg., of body-weight could be tolerated without producing glycosuria. The limit of tolerance in adults is about 2·5 g. per kg. of body-weight. The same observer examined the respiratory exchange in atrophic infants and found that their respiratory quotients do not suggest that their tissues are unable to utilise either fats or carbohydrates.

From a consideration of the literature and the result of his own experiments, Fleming concludes that atrophic children use sugar extravagantly, and are in a state of sugar starvation, the result of failure of the digestive processes. He says: "Evidence is brought forward which suggests that failure to thrive is not caused by inability of the organism to utilise any of the proximate principles of food, but rather by gastro-intestinal disturbances, leading to defective absorption, especially of carbohydrates." He is supported in this view by Guy,[17] and this presumably can be taken as representing the view of the pathogenesis of atrophy held by the Glasgow school.

It is, of course, universally recognised that gastro-intestinal disturbance is common in atrophy, and statistics have been already given on this point, but quite a large number of cases of atrophy do develop without any gastro-intestinal disturbance. If considerable amounts of sugar are given by the mouth, alimentary disturbance (fermentative diarrhœa) is frequently set up, and the only method (except intravenous or intraperitoneal injection of glucose) of giving a considerable amount of carbohydrate to satisfy the increased demand is to use a less easily fermentable sugar, such as dextrimaltose. It is highly probable that even in the normal child a certain amount of sugar is split up by bacterial activity; in children with nutritional disorders, however, the work of Bessau and Bossert[18] shows that an invasion of the upper intestinal tract by *Bacillus coli* definitely occurs. Metabolism absorption experiments therefore will not yield results comparable with the results obtained with fat, but if Fleming's view be correct one would expect to find an appreciable quantity of sugar in the stools in cases not complicated by diarrhœa. Utheim[8] examined seven athreptic infants, five of them over five day periods, and found that the sugar output was very small in all cases, not exceeding 1 per cent. of the intake, regardless of the consistency of the stools. It is worth noting that one of the infants was fed on a food containing 12·4 per cent. of sugar. She also quotes some findings by Usuki, who examined eight children, three of them being atrophic; the sugar output in all the cases varied between 0·1 per cent. and 1·9 per cent. of the intake, and it was not present in the atrophic infants in greater amounts than in the normal children.

These results certainly suggest very strongly that absorption of carbohydrates is not faulty; moreover, there is another and more probable explanation of the sugar starvation—namely, that absorption of carbohydrate is not abnormal in atrophy, but that there is excessive oxidation of sugar in the body and a depletion of the glycogen reserve. Certain of Fleming's results and calculations appear to me to support this view, rather than the one he enunciates.

A few metabolism experiments have been carried out on my cases. The sugar was estimated in the food and in the fæces by Schaffer and Hartman's method. The estimations were carried out over five day periods and the children were not suffering from diarrhœa. The absorption figures in all the cases (six in number) have been very high ones, the average figure being 99·79 per cent.

The results of these absorption experiments support the view that, in the absence of diarrhœa or loose stools, the digestion and absorption of carbohydrates in infantile atrophy is normal. Carbohydrate indigestion, the result of the fermentation of sugar, does, however, occur, and the stool then becomes acid, loose, and green, and may also show mucus and possibly soap curds. The child suffers from vomiting, has colic, and develops sore buttocks. If the indigestion continues, diarrhœa is likely to occur, and then fat absorption is diminished. As a result of these symptoms the already atrophic child becomes more wasted. Carbohydrate indigestion is more frequent than any other form of indigestion, and occurs particularly when the carbohydrate content of the food is high, unless the sugar given is one of the less fermentable forms—e.g., dextrimaltose. This form of indigestion is very similar to the description of Mehlnähr-

schaden by Czerny, and to the carbohydrate atrophy of Bloch, although the carbohydrate is not usually used in this country in the excessive amounts described by these writers. The hypertrophic form of carbohydrate dystrophy is occasionally seen, and when this is the case the child has usually been fed on proprietary foods. The severe types of this form of indigestion appear to be much more rarely seen in this country than on the continent. The treatment of this form of indigestion is, essentially, the limitation of the amount of carbohydrate used, and the substitution of a less fermentable type of sugar—e.g., dextrimaltose, &c.—for that previously used. For this purpose, if the child has been fed on proprietary food it is advantageous to change to a cows' milk mixture. On rare occasions it has been found necessary to give the food without any added sugar until the symptoms have improved. If diarrhœa occurs the treatment already outlined for fat indigestion should also be carried out.

THE METABOLISM OF PROTEIN IN INFANTILE ATROPHY AND PROTEIN INDIGESTION.

I have previously referred to the fact that Biedert, in 1869, first propounded the theory of the harmfulness of protein, and this theory has been disproved by Czerny, Finkelstein, and others; indeed, the pendulum of opinion has swung to the opposite extreme, and protein has been regarded as the one factor that does not lead to infantile atrophy, and the only factor in the food which many atrophic children can adequately deal with; hence the introduction of protein milk. I have used protein milk made by Finkelstein's method, with the exception that ordinary milk has been substituted for buttermilk. I have also used protein milk made by the addition of calcium caseinate "Casec" Mead) to cows' milk. Both these methods have yielded good results in atrophy, particularly when fermentative diarrhœa was present; but it has been my experience that this method of feeding is only a temporary expedient, for after a time loss of weight occurs again, and also in not a few cases hard protein curds appear in the stools, a true protein indigestion. Possibly this failure to continue the initial improvement is due to the alteration in proportion of fat to protein in protein milk, for it has been suggested by Maignon[19] that unless fat is present in the proper proportion, protein is not economically utilised and toxic products are formed.

The well-known observations of Gowland Hopkins, McCollum, Mendel and Osborne, &c., have completely altered earlier views as to the relationship of food protein to growth and the maintenance of life. Food protein is made up of a large number of radicles of amino-acids into which it is broken down during digestion; after absorption a certain number of these are built up again in the body into tissue proteins. Since the tissue proteins do not show the same proportion of amino-acids as the food protein, a certain number of the amino-acids in the food are not utilised, and these are used largely to provide energy being broken down into urea.

The proportions of the amino-acids in different foods varies considerably, but certain of them are essential for growth; in particular lysin, cystin, and tryptophane. Metabolism "balance" experiments may show good results, the animal showing a good nitrogen absorption and retention, yet in the absence of growth amino-acids there will not be any growth. Casein is a poor growth protein because it is very deficient in cystin; lactalbumin, on the contrary, is very efficient and contains of all proteins the highest proportion of leucin, lysin, and tryptophane (Holt),[20] and sufficient cystin to meet the demands of the growing tissue (McLeod)[21]; indeed, it appears to be the most efficient in supporting growth of all the proteins studied. The intake of protein in normal breast-fed children up to 9 months of age is about 1·5 g. per kg. of body-weight (Holt). Bottle-fed children of the same age, as is well known, take much larger quantities than this, the amount being 3 to 4 g. per kg. of body-weight. The increase in protein requirement is probably due to the different amino-acid content of the two milks (Holt), for it should be remembered that whereas lactalbumin forms two-thirds of the protein in human milk, five-sixths of the protein in cows' milk is casein.

In spite of the commonly accepted view that protein can do no harm, the possibility that atrophy may be due to the absorption of unaltered or slightly altered protein has been considered by several writers. Moro[22] found precipitin to cows' milk in blood removed at autopsy from two atrophic infants; Bauer[22] in four cases. Lust[22] showed that under certain conditions the intestinal tract was permeable to egg-albumin, and that this was most frequent in marasmus (decomposition) and diarrhœa (intoxication). This subject has recently been further investigated by Anderson and Schloss[23]; they point out that to cause a specific reaction in the organism protein must be absorbed in a form unaltered or only partly altered by digestion, since protein which has been digested as far as the peptones does not cause specific immune reactions. They examined the blood of 98 marasmic infants, and found that the blood of most of these contained precipitin to cows' milk. They also found that these infants were "apt to show precipitin to cows' milk in their blood only at the time when they begin to gain in weight, and that after a period of gain the precipitin disappears." They suggest that during the period when the infant fails to gain, foreign protein may be entering the blood in sufficient amounts to cause disturbance. Precipitin may be gradually formed as a result of this, and when in sufficient amount neutralises the effect of the foreign protein, and a gain in weight results. With the improvement in the patient's condition the intestinal tract becomes impermeable to undigested or incompletely digested protein, and the precipitin disappears from the blood. They admit that the reaction may be merely indicative of the incidental entrance of foreign protein into the blood-stream owing to a temporary change in the intestine, and be of no special ætiological significance. It is interesting to note that control tests carried out by them on new-born breast-fed children were all negative.

If, as I believe, the view is correct that infantile atrophy is a disorder of metabolism, it may well be that the intestinal mucous membrane shares in the "metabolic depression," becomes more permeable, and that the digestive processes are not properly carried out. Under such conditions absorption experiments would not be of any value in an attempt to prove or disprove this theory. It will be remembered that Finkelstein claims that the whey salts render the intestinal mucous membrane more permeable to sugar and salts, but that this view has not been substantiated, nor is there any evidence of the permeability of the intestinal wall to neutral fat.

Now if digestion is impaired it must, in the absence of diarrhœa, be due to defective ferment activity. It has already been demonstrated that there is not any deficiency of pancreatic lipase, which should be the case if there is enzyme deficiency, and it is surely a reasonable assumption that the other pancreatic ferments are also normal. I have not attempted to estimate the activity of pepsin in infantile atrophy, but it has been asserted that the secretion is somewhat diminished. Gastric digestion in infants fed on cows' milk is however often poor, because, owing to the high buffer value of cows' milk, the requisite hydrogen-ion concentration for pepsin activity is only reached after a considerable period. If the requisite hydrogen-ion concentration occurs in the normal time gastric digestion also appears to be normal. I propose later in this lecture to refer to observations on gastric acidity and hydrogen-ion concentration of the gastric juice and their application to treatment. Attempts to estimate rennin have been made, but from what is said later it will be seen that it is impossible to make any dogmatic statement about this ferment.

PROTEIN ABSORPTION.

A certain number of investigations have been undertaken to determine the protein absorption. The estimation of nitrogen by the Kjeldahl method has been carried out in the moist, and not in the dried fæces, because Gamble [24] has shown that up to 20 per cent. of the nitrogen in the stool may be lost in the process of drying. The estimations have been done in 24 hours specimens of stools, and the stools have been kept in an ice-box until the estimation was started. The estimations were carried out over a period of five days. The percentage absorption of nitrogen varied from 57·7 to 85·8 per cent.; the average for six cases was 77·3 per cent. Utheim,[8] in a series of 30 cases, found the average absorption was 73·8 per cent. Our results are only few in number, and I regret that I cannot give larger numbers, but the number of observations required to get even one result is so large and the amount of time occupied so great, that it has been only possible up to the present to put on record a limited number of observations. I hope that in the future Miss Hickmans and I shall be able to record a larger number of observations, because we found, during the investigations on fat and calcium metabolism, that dogmatic statements cannot be made unless the number of observations is a large one. However, as the results obtained up to the present confirm those of Utheim, they are probably correct. The results are strictly comparable, because the methods of investigation have been the same in both cases, whereas earlier investigators appear to have made nitrogen determinations on dried fæces, and usually to have made only one determination on the whole of the fæces collected during the experiment (Utheim). Our results show that, as in fat and carbohydrate, protein absorption also is normal in infantile atrophy.

Clinically, protein indigestion occurs very rarely, much more rarely than carbohydrate or fat indigestion, and in my experience has only occurred when an excess of protein is given in the food over a considerable period; its treatment therefore consists in feeding with cows' milk modification without the further addition of protein. Citration of the milk may also be useful in this condition.

It is probably unnecessary to add that in referring to treatment of these various forms of indigestion I have assumed that breast milk is unavailable. I might perhaps also add that in my experience the best results have been obtained by simple modifications of cows' milk.

INVESTIGATION OF GASTRIC SECRETION IN ATROPHY.

During the last three years a considerable number of test-meal observations have been made in infantile atrophy and pyloric stenosis, both by the Ewald method and by the fractional test-meal method. In all, some 50 examinations have been made by the latter method. The test-meal itself has varied; in the majority of cases it has been a 2 oz. meal consisting of equal parts of milk and water; in a few cases Meyer's barley gruel test-meal has been used,[25] but recently the practice has been to give the ordinary meal which the child is taking, since that probably gives a more accurate idea of what is happening in the child's stomach than the results obtained by suddenly changing the food, although the change may be to a standard meal.

The interval between the giving of the test-meal and the previous meal is three hours. I should like to have made this a longer period, but considering that the child does not get a full feed for somewhat over six hours, I have felt that, dealing as I have been with atrophic children, it would be unwise to give a longer interval. The food has been withdrawn every half hour, since it has not been found practicable to remove the contents at 15-minute intervals. The contents have been removed with a syringe and No. 6–7 Jacques soft rubber catheter. These investigations were started to determine whether it were possible, by means of a study of gastric secretion, to define certain clinical groups of wasting babies, as, for instance, the constant association of hyperacidity with pylorospasm. It may be stated at once that no such classification of infantile atrophy is possible.

The rate of emptying varies. The average time appears to be between two and two and a half hours, but in some cases it has not been possible to recover any milk later than half an hour after feeding. Cowie and Lyon [26] found that a prolonged emptying time of the stomach occurred with an excess or a deficiency of acid; whereas Babbott and others [27] state that the greater the acidity the more rapidly the stomach empties; and Marriott and Davidson [28] found that in general in infants with a deficiency in gastric acidity, a larger amount of the feeding could be recovered two hours after a meal than in those with an acidity approximating to that of normal breast-fed infants. As a general rule, I believe that the latter two groups of observers are right, but there are many exceptions. Cowie and Lyon's observations of delayed emptying with an excess of acid may possibly have been examples of the hyperacidity which occurs in some forms of pylorospasm.

The value for free hydrochloric acid is a variable one, but in a few cases no free hydrochloric acid was present during the whole period of time during which the food remained in the stomach. This is not a new observation; thus Chievitz,[25] in a recent paper, states that in children with alimentary disturbances more than half show low or absent free hydrochloric acid, and although weights are not given, this group includes cases of dystrophia alipogenetica and amylogenetica. Marriott and Davidson agree that acidity of gastric contents of infants suffering from nutritional disturbances is distinctly lower than in normal infants. Babbott and his co-workers say that artificially-fed infants produce only a small amount of hydrochloric acid during digestion, and the amount is not sufficient to show free hydrochloric acid. This, however, is not consistent with my results, since free hydrochloric acid has been present at some time during digestion in the great majority of cases.

The action of hydrochloric acid in digestion is due chiefly to the number of free hydrogen-ions present. Rennin acts best between pH 6·3 and 6·0. Pepsin, however, requires a greater degree of acidity, and does not begin to act until pH 5·0 reaching half activity at pH 4·0, and full activity at about pH 2·5. It is therefore obvious that if there is not enough hydrochloric acid secreted to bring the stomach contents to the requisite degree of acidity, gastric digestion cannot take place. The acidity may be low, either as a result of deficient secretion or because the acid secreted is neutralised by the food. The (alkali) buffer value of the various foods given is, therefore, of considerable importance, and as previously stated, the buffer value of cows' milk is a very high one.

It is interesting to compare the amounts of decinormal hydrochloric acid which it is necessary to add to various foods to bring their acidity to pH 5·2–5·4.

	c.cm.		c.cm.
Breast milk	1·3	Almata (1 in 8)	1·0
Cows' milk (undiluted).	3·3	Humanised (Trufood, dried)	3·1
Nestlé's (1 in 8)	2·7	Allenburys No. 1.. ..	3·1
Glaxo—full cream. ..	2·8		
Glaxo—half cream ..	2·7		

It is important, therefore, to reduce the buffer value of cows' milk, particularly when it is given to infants suffering from nutritional disorders. This may be done in several ways; it can be done by diluting cows' milk, but the dilution must be considerable, a dilution of one of milk to three of water having about the same buffer value as breast milk. From the figures just given it will be seen that by drying cows' milk the buffer value is diminished. Another method is to saturate the buffer with acid. Thus Faber [29] has recently suggested the addition of hydrochloric acid to cows' milk, and Marriott has for some time used lactic acid for the same purpose, and has reported very good results with this method of feeding. Protein milk may owe much of its value to the fact that it has a low buffer value.

The results obtained by metabolism experiments justify the conclusion that digestion is normal in atrophy in the absence of diarrhœa. Now if the degree of gastric acidity is insufficient to activate pepsin and rennin, it follows that more digestion is carried out in the small intestine than in those cases in which the gastric ferments are activated. This, together with the fact that in the partial or complete absence of hydrochloric acid bacterial invasion of the duodenum is more likely to occur, may be an explanation of the onset of some cases of diarrhœa in atrophy.

I have not used Marriott's lactic acid milk in cases of infantile atrophy, but I have used hydrochloric acid in the amounts suggested by Faber and with good results. To every ounce of milk is added 2 dr. of decinormal hydrochloric acid and 2 dr. of water. The addition of this amount of acid gives approximately a pH value of 6·0; the buffer value is about that of breast milk, and therefore the demands on the child's stomach for acid is equivalent to that of breast milk. Normally, such an addition of hydrochloric acid does not produce any appreciable alteration in the taste, nor is there any curdling. It is obviously important that the acid should be added to the milk and not milk to the acid, because in the latter case curdling will immediately take place. I have found that occasionally milk is curdled with this amount of acid: this is probably due to the fact that lactic acid formation has progressed to such a degree that by the addition of more acid the acidity is raised to the point when curdling occurs. The milk should therefore be as fresh as possible. Another practical point is that curdling is often prevented if the feed when being warmed is not made too hot.

I have not used this method of feeding in children under three months, and Faber does not recommend its usage in the first six weeks of life, his main reason for this being that breast milk is fairly alkaline (pH 7·7) until about the tenth day. I have made use of the method when children were not progressing on ordinary cows' milk mixture, and it appears to me to be a valuable addition to our methods of feeding. It is, however, somewhat difficult to order decinormal hydrochloric acid for out-patients, although the dilute hydrochloric acid of the British Pharmacopœia is decinormal acid, and I am now trying in some cases the effect of using citric acid to neutralise some of the buffer. Citric acid is easier to obtain than decinormal hydrochloric acid. The amount of citric acid which has to be added to cows' milk to bring it to the buffer value of breast milk is half a grain to the ounce of milk. Marriott and Davidson [28] state that citric acid produces diarrhœa, but in the amounts I use I have not found this to be the case. They also object to hydrochloric acid, that this acid is not destroyed in the body, and must be eliminated, thus throwing rather a severe strain on the acid-base regulating mechanism, which may lead to acidosis. This objection receives considerable support from the work of Shohl and Sato.[36] The clinical fact remains, however, that, using hydrochloric acid in the amounts stated above, gains occur and the children do well. In one case, in which the chlorides were estimated in the urine, the amount excreted was not more than the average of 10 atrophic cases fed by other methods. This case also showed a very high percentage of absorption of fat.

The estimation of rennin has been carried out in most of these cases; the method used has been that devised by Miller and Wilcox.[30] I have, however, come to the conclusion that this method does not furnish accurate results in fractional test-meal methods. There are two sources of error, first in the earlier readings the pH value of the stomach contents may not be low enough to activate the rennin, and secondly in cases where there is hyperacidity, as in pyloric stenosis or some cases of pylorospasm, the acid itself may be responsible for coagulating the milk. The controversy as to the identity or non-identity of rennin with pepsin still continues, but the evidence appears to me greatly to favour the view that they are two distinct enzymes. The only group of cases in which the fractional test-meal method gives anything like a real diagnostic help is in pyloric stenosis, in which case there is usually milk-clot and mucin present in the resting juice, often in considerable quantity, and the resting juice shows high total and high free acidity. The emptying time is prolonged occasionally up to five hours; bile has never been found, but there is frequently a considerable excess of mucin, usually high free and total acidity, and there is absence of duodenal regurgitation as shown by estimation of total and mineral chlorides by Volhard's method.

General Metabolism in Atrophy.

If it be true that, in general, digestion and absorption of food is normal in infantile atrophy, we must look for an explanation of the disorder in the internal metabolism of the body. I regret that I have few observations of my own to submit in proof of the occurrence of a disorder of metabolism. The cases showing a negative and a low calcium balance are, however, evidence in support of this view. This theory receives strong support from the observations of Utheim[8] who found a negative nitrogen balance in 7 out of 18 athreptic infants. Nitrogen absorption was normal, and the negative balance could therefore only be due either to a deficient utilisation of nitrogen or to actual destruction of the body tissues. She found in the urine certain organic acids excreted in excess of the normal, and these acids she regards as products of intermediate metabolism which would normally have broken down in the body. Corresponding with the negative nitrogen balance there was usually a negative or low salt balance. She also repeated and confirmed Freund's observations, that when benzol is given by the mouth to athreptic children less phenol is excreted in the urine than when given to normal children. The conversion of benzol to phenol is an oxidation process, and the differences in the amounts excreted between atrophic and normal children are not due to differences in the absorption from the alimentary tract.

A negative salt balance has also been found by earlier workers, but the strongest evidence in favour of this conception of atrophy is, I think, the work done by two independent investigators, Fleming[16] and Talbot,[31] on metabolism in infantile atrophy. The first of these investigators showed that the greater the degree of wasting the higher the heat output (obtained by indirect calorimetry) per kg. of body-weight—or, in other words, that the basal metabolism of wasted infants is higher than normal infants, and the greater the degree of wasting the higher the basal metabolism. If, however, the heat output per kg. of expected body-weight be considered, it is found that when the wasting has reached a certain degree (a loss of 35 per cent. of the expected body-weight) the greater the emaciation the lower is the heat output. Fleming thinks that it is justifiable to assume from these results that the early loss of weight is due to wastage of fats (or other metabolically inactive tissue), but that when 35 per cent. of the weight has been lost, wasting of the muscular or active metabolic tissues, on which the heat output depends, occurs, and hence the caloric output per kg. of expected weight decreases. There thus appears to be definite evidence of inefficient metabolism, to use his own words, "in atrophy the metabolism is carried on less economically than in health." The results obtained by estimation of the respiratory quotient showed that the tissues of atrophic children were well able to utilise both fats and carbohydrates. Fleming also accepts the view that there is not any evidence of faulty protein metabolism, but I have already quoted what appears to be very reliable evidence to the contrary.

Talbot's investigations confirm and extend Fleming's observations, for he finds that the metabolism becomes abnormal when the infant is 20 per cent. or more below the average weight. Further, he thinks his results show that in atrophy a heat production greater

than the normal is necessary to maintain body temperature, because of the relatively increased amount of body surface and the absence of a protective (Lusk) or insulating (Fleming) covering of subcutaneous fat; also, that it is reasonable to conclude that as long as the body is able it will respond to the demand and produce extra heat, but that if the indigestion, which in his opinion is primarily responsible for the malnutrition is not cured, the heat loss eventually will exceed production and a subnormal temperature result. The occurrence of a subnormal temperature, the abnormal sensitiveness of atrophic children to cold, and the necessity of supplying them with artificial warmth are familiar clinical facts.

Clinical verification of the experimental finding that the basal metabolism per kg. of body-weight is higher in infants with severe malnutrition than in normal infants can be obtained by working out the caloric intake of atrophic infants who are improving under treatment. In a considerable number of cases I have worked out the number of calories which have had to be given daily to secure a satisfactory increase in body-weight; I have only on rare occasions based a diet on what I calculated to be caloric requirements. In an unselected series of 40 cases I found that the number of calories per pound of body-weight required is 68, or 149 per kg. of body-weight, the range of calories in the series being 58 per pound (127 per kg.) to 85 per pound (178 per kg.). The highest caloric value diet that I have given has worked out at 108 per pound (237 per kg.) of body-weight, on which the infant did well.

Statements concerning the number of calories required by the normal child in the first few months of life vary according to the authority consulted. Marfan[32] gives 38·6 calories per pound (85 per kg.), which is very far below the figure I have given for atrophic cases. John Thomson[33] quotes Dennett's figures—viz., 50–55 calories per pound (110–121 calories per kg.) for average infants under 4 months and moderately thin infants of any age, and 40–45 per pound (88–99 per kg.) for fat infants over 4 months. According to Morse and Talbot,[34] the normal infant has a basal metabolism of 23–30 calories per pound (50–65 per kg.), and this may be increased from 40 per cent. (i.e., 32 calories) to 100 per cent. (i.e., 46–60 calories per pound) in the change from complete muscular repose to active exercise.

The usual method of feeding in this country has been to feed by weight, for instance, to give to a child 5 months old, having the weight of a normal child of two months, the diet for a child 2 months old. The results of estimating the caloric value of the diets necessary to gain weight, however, shows that the rule should be rather to feed by age—i.e., by expected weight, than to feed by weight. The same end is obtained by certain French pædiatrists—e.g., Variot—who feeds by length and not by weight, and also by von Pirquet's "nem" system. A "nem" is the food value of 1 g. of standard breast milk, and to arrive at the number of "nem" required by an infant the following formulæ are used. At birth $0{\cdot}5si^2$, from the second to the sixth month $0{\cdot}6si^2$, and at the seventh month $0{\cdot}7si^2$, where "si" is the sitting height of the child in centimetres.

Although high caloric feeding appears to be essential to success in treatment, many children, when first coming under observation, are unwilling to take enough food to make high caloric feeding possible. It is a common experience to find that for some time after treatment has been started atrophic children do not show an increase in weight, and, indeed, they may even lose weight. These occurrences may be due to a diet of too low a caloric value, for the reason just mentioned; or they may be due to the possibility that this time represents the "period of repair" to which Marriott refers and during which period, he considers, that there is an effort on the part of the organism to restore the blood volume to normal.

In cases that recover, the recovery is complete and there are no after-effects. A number of cases have recently been examined after an interval of one or two years since their discharge from hospital. These children appear to be normal in every way, except that a few show clinical evidence of mild rickets. In a few cases also on X ray examination there was radiographic evidence of rickets. The only case of severe rickets occurred in a case of pyloric stenosis which had been cured by operation.

After this consideration of the views put forward by workers on this subject, the evidence on which these views are founded and my own results, I would submit that it has been demonstrated that infantile atrophy is not a gastro-intestinal disorder, but that in the present state of our knowledge it should be regarded as a disorder of metabolism, and also that there is a great deal of evidence in favour of the view originally put forward by early English writers on this subject, and now strongly held by Marriott, that the condition is essentially due to starvation. The marasmic condition of infants with pyloric stenosis is obviously due to partial starvation, and all the observations that have been made on their metabolism after Rammstedt's operation and when fed on small feeds show that it is identical with that of infant atrophy.

SUMMARY.

The theory and facts of infantile atrophy that I have attempted to bring to your notice may be shortly summarised. An infant after thriving normally commences to lose weight for one or more causes, such as:—

1. Insufficient food. Either an insufficient supply or because some condition like pyloric stenosis prevents the child from obtaining a normal supply.
2. Unsuitable food. All artificial foods; deficiency in fat or protein; excess of carbohydrates; excess of fat; absence of vitamins, &c.
3. Diarrhœa and vomiting.
4. The occurrence of some infection—e.g., pyelitis, pneumonia.

The conditions described under the last two headings may be cured when the child comes under observation for atrophy.

5. Hygienic surroundings.
6. Pre-natal influences and constitutional causes. These factors are very real ones and of great importance.

Weight is lost at the expense of the metabolically inactive tissues and water until the child is 20 per cent. under the expected weight for its age. From this point onwards the child becomes an atrophic infant, and is unable to utilise its food properly. The basal metabolism is increased and continues to increase with increasing emaciation; hence high caloric feeding is essential. Absorption from the intestinal tract, except under certain conditions, such as diarrhœa and some forms of fat, carbohydrate and protein indigestion, is essentially normal. It is difficult rigidly to separate the consideration of the various food factors because of their great degree of interdependence—e.g., fats and calcium, fats and carbohydrates; similarly there is difficulty in separating cases into clearly-cut clinical syndromes of fat, carbohydrate, and protein indigestion. The respiratory quotient shows that fats and carbohydrates can be utilised if absorbed; indeed, there appears to be a real sugar hunger. The limit to the intake of sugar is fermentation and the production of diarrhœa; this is a much more frequent occurrence in artificially fed than in breast-fed babies, due possibly to invasion of the upper parts of the small intestine with *B. coli*. When diarrhœa occurs carbohydrate is not absorbed well and weight is lost. In the absence of diarrhœa, therefore, considerable quantities of carbohydrates can be absorbed, and to obtain this end—i.e., freedom from diarrhœa—a less fermentable sugar, such as dextrimaltose, is used.

Many of these children can and do absorb a larger amount of fat per kg. of body-weight than normal children usually do, but a high fat dietary may cause fat indigestion, and in diarrhœa, however produced, there is diminished fat absorption. Calcium absorption

is usually very good if a sufficient supply of fat and calcium is present in the food; indeed, many absorb more calcium per kg. of body-weight than normal children usually do; but in a poor fat or calcium dietary the absorption is not good. There is, however, in many cases faulty salt metabolism, which may result in low retention values for calcium. Protein metabolism is also faulty. The absorption of protein is normal: protein indigestion is a rare condition and has only been seen where there has been a large protein intake over a considerable period. The metabolic disturbance is essentially an abnormal salt and protein metabolism, resulting in poor retention values for mineral salts and nitrogen.

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THE RAPID CONTROL OF DIPHTHERIA OUTBREAKS IN INSTITUTIONS.

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A. J. EAGLETON, M.D. LOND.;

AND

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(*From the Wellcome Physiological Research Laboratories.*)

IT would appear at first sight that testing by the Schick method and active immunisation against diphtheria can be usefully employed only during the inter-epidemic periods, but are of little value in dealing with an active epidemic. These newer methods of prophylaxis are, however, of great value in the control of epidemics, at least in camps, schools, hospitals, or similar institutions where the population is under control. The customary method of handling such epidemics is to swab the throats and perhaps the noses of all the subjects and to give antitoxin to those who have been in contact with "cases" or with known carriers; it is, however, difficult to know how close has been the contact between given individuals.

It is important to remember that, from the point of view of their immunity and infectiousness, six types of subject may be met with. We may divide a population into two groups, "Schick positive reactors" and "Schick negative reactors." We may further divide each group into those with "negative" swabs and those with "positive" swabs, the latter being again divided into those yielding virulent and those with avirulent diphtheria bacilli. These six types may be set out thus:—

A.	Schick positive,	swab	negative.
B.	"	"	positive, bacilli avirulent.
C.	"	"	" virulent.
D.	" negative	"	negative.
E.	"	"	positive, bacilli avirulent.
F.	"	"	" virulent.

The usual method of dealing with a population infected with diphtheria depends upon the bacteriological findings alone, those with "negative swabs" remaining free, while those yielding "positive swabs" are isolated. The isolation ward would then contain classes B, C, E, F. Class C are obviously those incubating diphtheria, and such subjects will, within a day or two, develop clinical diphtheria. These are rightly present in the isolation ward. Class E are not susceptible to diphtheria and are of no further interest; since their bacilli are avirulent it matters not whether people in this class are free or isolated. But the juxtaposition of F, the non-susceptible carriers of virulent bacilli, and B, the susceptible subjects, involves danger. If amongst F there exist "profuse carriers" the danger to class B is acute.

We recently had occasion to examine a small ward in which were isolated patients whose swabs had previously been diagnosed "positive." We found, amongst nine patients, representatives of classes B, E, and F. A smear made from an overnight culture of one of the patients resembled that from a clinical case of diphtheria, showing practically nothing but bacilli morphologically resembling Klebs-Löffler bacilli; the bacilli proved virulent. The girl gave a "negative response" to the Schick test. She clearly belonged to class F and was a "profuse virulent carrier," and, one must assume, a source of acute danger to people in class B, who are susceptible to diphtheria.

It may be objected that all in the isolation ward would receive protection from an injection of diphtheria antitoxin. The disadvantage of this procedure is that the protection rapidly disappears, and in a few weeks the susceptible people are again exposed to danger. We have had under observation during the past year and a half an institution in which prophylactic injections of antitoxin were given to all the inmates. The epidemic at once ceased, but about a month later cases of diphtheria began to recur; injections were again given, but sporadic cases occurred for many months. Our advice was then asked. Since the children were all very young and one might get Schick negative reactions due only to passive immunity derived from the mother, we urged active immunisation with toxin-antitoxin mixtures. This has been done and the children are now immune.

Precautions against Danger of Mixing Virulent Carriers and Susceptible Patients.

In order to avoid the danger of mixing classes F and B, the "virulent carrier" and the susceptible patient, we would recommend, as the result of our experience in a recent hospital epidemic, the following procedure. When an outbreak has occurred, test every inmate at once by the Schick method and swab throat and nose. Within 24 hours the results of the Schick test can be read with 90 or 95 per cent. accuracy (and a day or two later with practically 100 per cent. accuracy). The results obtained from the Löffler culture made from the

swab are also known within 24 hours. The object of the common procedure of swabbing is to detect the dangerous "carrier." We can, however, do this by the use of the Schick test alone with fair certainty, by isolating at once all those in classes E and F, while those "Schick positive" and "swab positive" can, with little danger, remain free but subject to inspection twice daily for a day or two. At this inspection any person incubating diphtheria (in the rare instances where a representative of class C is present) is detected at the earliest onset of illness with sore-throat, and is given antitoxin immediately. Within two to seven days the results of the "virulence test" of cultures from classes E and F will be known and E may be released. There will remain group F, the dangerous carriers. The further treatment of these people is a problem of administrative difficulty and can apparently be met only by isolation until a succession of "negative swabs" can be obtained. In a group of 11 boys we have recently examined, eight yielded successive negative swabs after an average of four weeks' isolation. It is necessary to relieve pathological conditions of nose and throat and remove tonsils if the infection persists in them. Obstinately persistent virulent carriers are met with occasionally; the community has not yet discovered what is to be done with such people, but at all events they will, by the procedure above described, be removed from their companions in the institution.

Rapid Establishment of Control.

The method outlined above calls for a moderate amount of immediate work, which is well repaid by the rapid attainment of control. One may, if necessary, reduce the immediate work by postponing the swabbing. The Schick test can, if discipline and organisation are good, be done rapidly; we recently found that a pair of operators could do the intracutaneous injections for 286 patients in 68 minutes. The Schick test results will enable one next day to isolate all Schick negative subjects; these can be swabbed as soon as time permits and those with a "negative swab" released, while cultures from the "positive swab" patients are tested for virulence. Those with avirulent bacilli are at once released and the dangerous F group retained.

With regard to the Schick positive "reactors" if they are to remain in the institution for many weeks one proceeds at once to immunise them. It has been our experience during the past year that three injections of toxin-antitoxin mixture given at weekly intervals cause from 50 to 80 per cent. of the people to become Schick negative reactors within two weeks of the last injection, and upwards of 80 or 90 per cent. within four or six weeks of the last injection.

Basis of Effective Control.

It will be seen that the plan advocated here depends upon the truth of the following "propositions": (1) Schick negative reactors are not susceptible to diphtheria. (2) Schick positive reactors are susceptible to diphtheria. (3) Schick positive reactors never harbour virulent bacilli detectable by ordinary swab-culture methods unless they are suffering from or are incubating diphtheria. (4) Carriers of virulent bacilli are immune and are always negative Schick reactors. (5) "Avirulent" bacilli do not cause diphtheria, and therefore "avirulent carriers" are of no importance to the public health authority. (6) One efficient swabbing of a population gives a sufficient working knowledge of the location of infection—i.e., all "profuse," and therefore dangerous, carriers will be detected.

We are fully aware that the truth of these "propositions" may be contested. It is, however, sufficient for effective epidemic control if they approximate to truth, and we think the available experience of other workers and our own results indicate that these propositions represent a very close approximation to truth. We would maintain with confidence that by the application of the measures suggested one can, within 24 hours, obtain effective control of an outbreak of diphtheria in any institution where efficient isolation can be ensured. We hope the method will be thoroughly tested.

Summary.

In an outbreak of diphtheria:—

1. Schick test all patients.
2. If possible swab all patients, throat and nose.
3. Next day, isolate in one ward all "Schick negative" patients.
4. For a few days, see twice daily all "Schick positive" reactors.
5. Test for virulence all positive swabs from "Schick negative" reactors; release "avirulent" but rigidly isolate all "virulent carriers."
6. Commence at once to inject toxin-antitoxin mixtures into all "Schick positive reactors."

Note.—Since writing this paper our attention has been called to the valuable study by E. H. R. Harries on the Carrier of Diphtheria Bacilli from the Fever Hospital Standpoint in the *Medical Officer*, March 4th, 1922, where a similar method was suggested. "On the occurrence of clinical diphtheria in a scarlet fever ward, it is not a difficult matter to Schick test the remainder of the ward, and so separate the susceptible from the non-susceptible cases. Susceptible cases can be placed apart and if necessary be passively immunised by antitoxin." We hope that Dr. Harries will soon publish his further experience with the method.

Clinical and Laboratory Notes.

TEMPORARY COLOUR-BLINDNESS.

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THOUGH congenital colour-blindness has chiefly occupied the attention of those who have paid attention to the subject, it is well known that colour-blindness may be acquired through disease or injury. These cases have been regarded as permanent. It is, however, not known that colour-blindness similar in character to a very bad dichromic may occur as a purely temporary condition.

The colour sense, even with normal-sighted persons, varies according to the condition of the health. When a series of colour equations have been made by three normal-sighted persons it will be found that on certain days one of the three will put more or less green in the equation than on the previous occasion, whilst the other two observers will make the same equation as before. This condition, whilst a disturbing factor, usually varies within the limits of normal colour-vision. The nerve cells whose function it is to perceive colour seem to be much more liable to affection by disease, especially by toxic influences, than those of the visual centre. Acquired colour-blindness seems to be closely related in its general characters to the congenital form. A man suffering from general paralysis of the insane may pass through all the degrees of congenital colour-blindness. A woman became totally colour-blind after ear disease; she was examined when she was regaining a certain amount of colour perception and could distinguish between red and violet, the rest of the spectrum appearing grey. A signalman became totally colour-blind after tetanus, his visual acuity being partly 6/6; he had previously passed the wool test several times.

The following is an illustrative case. The examinee was a man who had just recovered from influenza,

but he appeared perfectly well and made no complaint of any kind. His form vision was 5/5 partly, both eyes being used. Examined with the lantern he called green both white and red; red he called white, and white red.

Examined with the spectrum he called the region from λ 650μμ–λ 571μμ (red, orange, yellow, and yellow-green) red; the region from λ 571μμ to λ 538μμ (green) white; the region from λ 538μμ to λ 442μμ (green, blue, and violet) blue; and purple from λ 442μμ to the end. The apex of his luminosity curve was at the normal point λ 585μμ. He made the following equations: 45 red λ 665μμ mixed with 2 of green λ 520μμ matched 15 white. The normal equation is 45 red with 13 green equals 16 white, so that he was matching a bright red with white. He made an equation of 10 λ 633μμ red with 6 λ 540μμ green equals 22 white. He also agreed with the normal equation which is 10 red and 10 green equals 20 white, but required the comparison white light increased in luminosity. Examined again five months afterwards his colour-vision was normal in every respect.

TWO CASES OF CONGENITAL DEFORMITIES OF THE HANDS AND FEET.

BY NORMAN F. SMITH, M.B., B.CH. OXF.,
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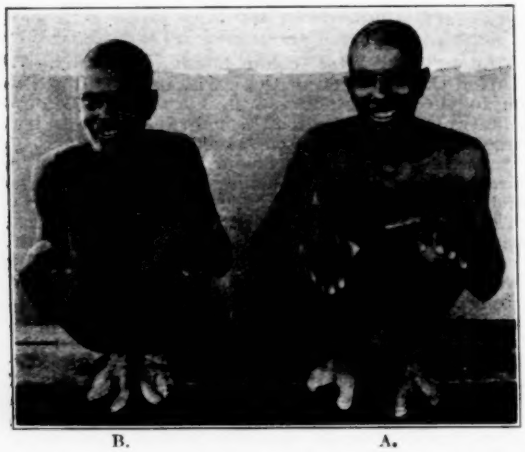
THE two men depicted in the illustration are brothers from a village near Luxor who passed through quarantine at Wadi Halfa on their way to work on the cotton plantations in the Southern Sudan.

History.—A. is aged 20, B. 18 years. There are two elder sisters and two younger sisters and one younger brother. No other members of the family are known to suffer from any deformity. The condition is attributed by the natives to the fact that during these two pregnancies their mother developed a craving to behold geese, which she apparently satisfied to the full. They call the condition "goose-foot."



B. A.

Sudanese brothers, aged 18 and 20 years, with congenital deformities of hands and feet.

Present Condition.—Both men, with the exception of their fingers and toes, are well developed and of normal intelligence, showing no signs of disease. My own camera being out of action, I sent for the local native photographer; unfortunately the "close-up" photograph of the hands were failures. Also I had no X rays at my disposal.

The detailed description of the conditions is as follows:—

CASE A.—Left hand: normal.

Right hand: Thumb webbed and stunted, hand otherwise normal.

Left foot: "Cloven." Big toe normal; second and third toes not represented beyond metatarsals. A median cleft runs proximally the whole thickness of the foot to the fibular side of the ball of the big toe. Fourth toe not represented. No metatarsal. Fifth toe acutely flexed. Otherwise normal.

Right foot: "Cloven." Big toe normal; second and third toes not represented beyond metatarsals. Fourth and fifth toes syndactyly. Two nails.

CASE B.—Left hand: Thumb diminutive, otherwise normal. Index finger, two sets of phalanges, (*a*) diminutive and springing from first metacarpal, (*b*) normal in size, but bent by webbing to meet (*a*) at base of one large nail. Middle finger represented by a soft pad over head of third metacarpal bone from which runs obliquely a phalangeal bone to join the first interphalangeal joint of the ring finger. Ring finger normal. Little finger normal.

Right hand: Thumb and index finger syndactyly. The first and second metacarpals run side by side. The two second phalanges are fused into a triangular plate bearing two equal nails. There is no joint between the first phalanges and this plate. Middle finger completely flexed by webbing. No sign of nail formation. Ring finger normal. Little finger normal.

Left foot: "Cloven." Big toe valgus, otherwise normal. Second and third toes not represented; no metatarsals; cleft as in A. Fourth and fifth toes, complete syndactyly. Two well-formed nails.

Right foot: "Cloven." Big toe normal. Second and third toes not represented; no metatarsals. Fourth toe, metatarsal fused with fifth, a diminutive toe.

The points of especial interest would seem to be: (1) The variety of deformities found in each case; (2) the entire lack of symmetry; (3) the absence of family history; (4) the comparative rarity of survival to adult life of persons suffering from congenital deformities amongst semi-civilised peoples; (5) the attributed "exciting cause."

RHINOSPORIDIUM SEEBERI (*KINEALYI*) IN A MALABAR WOMAN.

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IN a paper on *Rhinosporidium Kinealyi*, by Major R. E. Wright and myself, read at the Indian Science Congress held at Madras in January, 1922, it was pointed out that no case of infection of woman by the parasite had been observed by us or recorded in the literature. It was our opinion that women were susceptible to infection and that such cases were being missed or overlooked. In October, 1922, Major G. Pandalai, I.M.S., consulted me about a Malabar woman who had a recurring nasal polypus, and I am indebted to him for the following history of the disease in this patient. The history is interesting also for the facts that the nasal growth had recurred for the eighth time and that the disease lasted for nearly 20 years.

The case is that of a married woman, aged 34, with healthy children, who have no nasal polypi. She began 20 years ago to have nasal obstruction. There is deformity of the bridge of the nose. The nasal polypus was removed by forceps for the first time in 1904, and the recurring growths subsequently in 1908, 1910, 1914, and 1916. In 1918 the growth reappeared and was taken out by forceps; the base of the growth was cauterised and part of the middle turbinal removed. The growth, however, recurred and was removed in 1921 by forceps. On none of these occasions was the growth sent up for microscopical examination. In October, 1922, the polypus was observed to reappear in the nose and Major Pandalai snipped off a piece for microscopical examination which confirmed its rhinosporidial character. At my suggestion a 2 per cent. watery solution of tartar emetic locally is being tried. I heard that the patient had some relief in the nasal obstruction. A cure by tartar emetic local application is not claimed, as the patient is still under observation.

I am confident that, if a systematic microscopical examination of all nasal polypi removed by operation at the various hospitals in the Madras Presidency were conducted, many cases of the parasitic infection in women would be brought to light.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF NEUROLOGY.

THE VALUE OF X RAYS IN CEREBRAL AND SPINAL LOCALISATION.

A MEETING of this section was held on April 10th, DR. WILFRED HARRIS being in the chair, when the discussion took place on the value of X rays in the localisation of cerebral and spinal tumours, with special reference to ventriculography and lipiodol injections.

MR. PERCY SARGENT, in opening the debate, said that last year he saw Prof. J. Sicard at work in Paris on cases in which radiography was carried out after the injection into the spinal theca of a substance which was opaque to X rays. He was greatly impressed by the possibilities of the method, and had used it on a number of occasions. The substance was an oily preparation obtained from the seeds of the black poppy and was impregnated with 40 per cent. iodine. That no ill-results had been recorded from its use was probably attributable to the extreme slowness with which the iodine was absorbed; indeed it was not known how long the lipiodol would remain in the tissues, but it was certainly longer than three months. The injection was done with the patient seated in a wheel-chair, and as soon as it was finished he was wheeled to the X ray room. The head of the patient was slightly inclined forwards, and an ordinary lumbar puncture needle introduced into the mid-line between the atlas and the occipital bone. When the atlanto-occipital ligament had been pierced, there was a 1 cm. space before the cord was encountered, therefore careful manipulation should prevent the cord being wounded. An empty needle was inserted, and a little cerebro-spinal fluid withdrawn, and then 1 to 2 c.cm. of lipiodol injected, and, with a second syringe, a few c.cm. of normal saline, the latter for the prevention of staining of the tissues on withdrawal of the needle. By the time the patient reached the X ray room the lipiodol had fallen to the bottom of the theca, where it was usually seen as a cone-shaped or a rounded mass if no block existed. Where a complete block was present, the lipiodol was arrested at that point. He showed a skiagram of a case of extra-thecal sarcoma, in which symptoms had existed about ten weeks. The signs of pressure were severe, but not complete, and the actual level varied somewhat and was not very clearly cut. Injection of lipiodol into the theca showed the exact situation of the upper limit of the block, and this was verified at operation. Another case portrayed was that of a neuro-fibroma situated on one of the roots inside the spinal theca; the neurological signs corresponded. At operation he found that the curved line in the skiagram represented the upper surface of the tumour, and the method not only confirmed the neurologist's opinion, but showed that the tumour could be removed through a comparatively small opening, nothing in the way of exploration being required. To determine upper and lower limits of the block two injections should be done, one with the patient tied to the table and inverted on it.

As extra-medullary tumours were usually small, and intra-medullary tumours might extend over many segments of the cord, this technique possibly presented a help towards the differentiation of intra-medullary from extra-medullary tumours. He had also used the method satisfactorily in a case of meningitis circumscripta, of which the skiagrams were exhibited. He had also found the method valuable in cases in which the neurological signs as to the upper limit of the lesion were variable or equivocal. One instructive case was that of a man, aged 38, who for more than two years had had a fixed pain at the level of the ninth thoracic root, with disturbances of micturition, weakness of legs, and defective sensibility of certain segments. The symptoms varied not only from day to day, but almost hourly. Injections of lipiodol on three occasions, the second at 54 hours and the third at 120 hours, determined the site, and laminectomy revealed a condition in which there were large angiomatous vessels, giving an appearance similar to cirsoid aneurysm, this providing the key to the variability of the symptoms. Mr. Sargent had also used it in two cases of spinal caries with a partial compression paraplegia, and each showed a long persistent streak of lipiodol along one aspect of the cord. As neither had yet been operated upon, he was unable to give any explanation of the appearance. Summarising, he said that in this method the profession possessed an aid to diagnosis which was of considerable value. It enabled one to ascertain whether or not there was a block in the spinal theca, and to know whether a block was complete or only partial; and in the latter one derived a good indication for operative attack. By it, also, one could distinguish between meningitis and other conditions, and between intra- and extra-medullary tumours. In addition, it gave evidence of the exact relations of the tumour to the bones, and enabled the surgeon to approach the lesion with greater precision and through a smaller wound than formerly.

MR. GEOFFREY JEFFERSON devoted his attention to the radiographic diagnosis of pathological conditions within the skull, and particularly to the localisation of cerebral tumours, and the advantages which seemed to accrue from the injection of air itself. He first showed skiagrams of skulls of cases which during life had sustained great increase in intracranial tension; in some there was a curious sand-rippling appearance in the frontal region, and the pituitary body was compressed. In a case of hydrocephalus the diaphragma cellæ was widely opened. In some similar cases there were a number of small herniations and a disappearance of the posterior clinoid processes. He advocated the routine taking of stereoscopic skiagrams, and keeping a watch for all possible points of bone erosion, especially round about the middle fossa and the lesser wings of the sphenoid. One might then gain valuable information in the localisation of basal endotheliomata, as these caused proliferation of overlying bone. Speaking of ventriculography, he said it was, especially in this country, still very much in the balance. It was largely accepted, and was being used increasingly in the United States. The chief trouble was that which followed on its advocates having claimed more for the method than the cases seemed to justify. The speaker had made 13 air injections on ten patients, and as a result he felt more favourably disposed to the method than he was at first. If the appropriate diaphragm was used, good results should be obtainable with small quantities of air injected and the invariable use of stereoscopic skiagraphy. No doubt ventriculography had a definite mortality; two of his own ten cases had died. One was a child with hydrocephalus, and it died three days after replacement of 80 c.cm. of cerebro-spinal fluid by air. Possibly the child might have died after a puncture of any kind, but the death should be attributed to the particular procedure. In the other fatal case he had tried bilateral occipital puncture in a case in which a cerebral tumour could not be localised, and he failed to strike the fluid with either of his tappings, and the woman died a week later. No post-mortem was allowed. He entertained considerable hopes from the method following upon experience and improved technique, for several points had not yet been settled. One concerned the amount of air which should be injected. Should one be satisfied with extracting 20 to 30 c.cm. of cerebro-spinal fluid? He had been disappointed by the results when using only 25 c.cm. of air.

Discussion.

SIR JAMES PURVES STEWART said he considered that the injection of air into the spinal theca was of diag-

nostic value, and he showed a number of skiagrams of cases in which he had carried it out. It was especially useful in regions where diagnosis with exactitude was notoriously difficult. In some cases he got a definite picture from the injection of 70 c.cm. of air 5 c.cm. at a time. Precision was greatly helped by this method in supra-tentorial tumours. He also showed a number of X ray plates derived after injection of lipiodol, and remarked on the importance of having the patient's head in the right position when carrying out the injection.

MR. A. A. MCCONNELL also showed a number of skiagrams of his cases in which he had injected lipiodol. One was that in which it could not be determined whether the patient had a frontal tumour or a posterior fossa tumour. An X ray diagnosis was made following ventriculography, and after death a glioma of the frontal lobe was found, which bulged into the anterior horn. Two of the ten patients on whom he did the successful introduction of air died, one eight hours after the injection, the other 14 hours after, and both died in the same way—i.e., suddenly, as if they had been shot. Both had posterior fossa tumours and gross deformity of the medulla. It was questionable whether those fatalities were definitely due to the air injection, as sudden death was not uncommon in such cases; still, it was safer to blame the method, and study how they could be avoided in the future. He regarded as the most important item in the technique the avoidance of any sudden change in the intracranial pressure from the injection of air, and that could be ensured by the slow withdrawal of only small quantities of fluid at a time, not more than 5 c.cm., the blood pressure being taken as the criterion of the intracranial pressure. In cases of internal hydrocephalus the occipital route was the easiest by which to reach the ventricle, but when the ventricle was small or normal the lateral method was best. Injection into the lumbar region gave him less information than direct injection into the ventricle did. The injection of 25 c.cm. of air should cause the condition to show up well. He referred to the fact that there was still a good deal of uncertainty in the interpretation of radiograms, even of the stomach, and considered that a careful use and study of this method would result in deriving much help from it.

The CHAIRMAN said that ventriculography seemed to him to be a dangerous procedure, and that it should not be done unless grave reason could be shown for it. The use of lipiodol in the way described seemed to be much less dangerous, and the advantages appeared so obvious from Mr. Sargent's slides that it was probably a justifiable procedure.

Mr. L. B. RAWLING said he felt that lipiodol was a substance which should be tried; it appeared to be devoid of danger, and in some cases gave quite good results. He shared Dr. Wilfred Harris's views on ventriculography; it did not promise much advantage, and seemed to present considerable risks.

Dr. C. P. SYMONDS said that the absence of a high protein content in the cerebro-spinal fluid obtained from lumbar puncture did not absolutely exclude the presence of a compression lesion of the spinal cord. A recent case he had was that of woman who for some time had a transverse lesion of the spinal cord. She had been under his care before, when the fluid from lumbar puncture had a normal protein content. On this later occasion it contained 0·2 per cent. protein, and on injecting lipiodol it was completely arrested at the fourth dorsal level. Operation was done and an extra-dural lipoma was removed. An interesting point was as to which method of inquiry was likely to give the first evidence of subarachnoid blockings, lipiodol injections or estimations of the protein content of the cerebro-spinal fluid.

A number of questions were asked, and the openers briefly replied.

SECTION OF ORTHOPÆDIC SURGERY.

DISCUSSION ON TUBERCULOUS DISEASE OF THE HIP-JOINT.

A MEETING of this section was held on April 1st, with Mr. R. C. ELMSLIE, the President, in the chair, when a discussion was held upon the Treatment and Functional Results of Tuberculous Disease of the Hip-joint.

Urgency of Early Treatment.

Mr. W. T. G. PUGH, who opened the discussion, said that it was now almost unnecessary to emphasise the extreme importance of heliotherapy (or artificial light treatment during the winter months), for the great value of this form of treatment was now widely recognised. Yet the urgency of the need for early treatment in the country of tuberculosis of bones and joints had not yet been fully impressed upon the profession, and the earlier diagnosis which undoubtedly obtained now was not always followed by early treatment upon the best possible lines. Less than one-fifth of the cases admitted to Carshalton came during the first three months of the disease. According to accepted pathology, the tuberculous process began in the red marrow of the head of the femur and was for a variable time confined to the bone. Though certain sympathetic changes took place in the joint during this stage these were capable of complete resolution. If, however, the tuberculous focus were allowed to find a way into the joint, as it generally did within three months, permanent damage to the joint was inevitable. Cases were cited and photographs exhibited to illustrate the almost perfect functional results with a mobile joint which had been obtained when the correct treatment was instituted during the first stage; these were contrasted with the results of treatment begun after this stage had passed. A possible objection that there was no definite proof that the first series of cases was truly tuberculous could only be met by the reply that such happy results could only be obtained when the treatment was instituted at such an early stage that the diagnosis rested upon the symptoms and the interpretation of the X ray plate; the classical signs described in text-books were those of the later stage in which the joint was grossly infected.

Deformities Resulting from Incorrect Treatment.

Genu recurvatum was a deformity not uncommonly seen in cases which had been recumbent for a year or more with the knee fully extended. Where prolonged recumbency was necessary the knee should be kept slightly flexed. Genu valgum occurred generally from faulty splinting, but also at times from no ascertained cause. Scoliosis also was due to faulty splinting together with fixation of the hip in insufficient flexion and resulted from the efforts of the child to twist the body into a "sitting position" with the diseased hip held rigidly in full extension. Where the hip was ankylosed the speaker considered the optimum position to be one of 35° of flexion measured with the lumbar spine in contact with the table. This constituted the most satisfactory compromise; more flexion, while giving greater comfort in sitting down, produced a degree of lordosis in standing which often became painful in later life. For the correction of the lesser degrees of adduction Mr. Pugh practised and advised tenotomy of the adductors; but where the adduction was extreme and there was a fibrous ankylosis of the hip recurrence took place after tenotomy so that he performed a sub-trochanteric osteotomy and allowed the upper end of the lower fragment to unite with the pelvis or the lower part of the femoral neck. As regards the treatment of "abscesses," he preferred simple aspiration and did not inject any solution. When aspiration had failed or a soft spot had formed in the deep fascia he considered further delay useless and operated with the most rigid aseptic precautions, expressing the lining membrane and sewing up the wound. Sinuses were excised; the wound was bipped and sewn up without drainage. This failed in about 40 per cent. of cases,

but a repetition of the operation after an interval was usually successful.

Mechanical Methods of Fixation.

Thomas, whose splint was first described 49 years ago, treated his better-class patients with splintage in bed, but his hospital patients were allowed to get about in the hip-splint with crutches and a patten on the sound foot. The latter practice resulted in a hip ankylosed in some adduction. Since the speaker believed that pressure between the joint surfaces had a prejudicial effect, he regarded some form of traction as essential in addition to immobilisation. After describing briefly the methods of fixation employed by Sayre, Lorenz, Sir R. Jones, Rollier, and others, Mr. Pugh proceeded to describe the method employed at Carshalton. With early and adequate treatment useful movement of 20° or more might be obtained in many cases, and this should be the aim of treatment. The deformity should be corrected by steady traction, under an anæsthetic if necessary, and weight extension applied to the thigh by moleskin strapping. If there was much thickening with considerable deformity it was better to correct gradually by weight extension. The joint should at the same time be immobilised by a plaster spica, the front part of which should be removed to allow of the detection of abscess formation. A perineal band for the opposite groin should be attached to studs fixed in the plaster; the latter, while it did not interfere with traction, prevented jarring of the joint and consequent muscular spasm when the bed-pan was given. The use of a frame and carriage as at Carshalton had the advantages that both knees could be kept slightly flexed, rotation could be prevented by the use of a sandal to which a wire support was attached, and exercise of the sound limb became possible without disturbing the affected joint. When the disease was quiescent, as shown by X ray examination and the fact that even slight tonic contraction had been completely absent for months, the weight extension which had been gradually reduced should be omitted, and the movements which the patient usually tried to make at this stage encouraged under careful supervision: no attempt at passive movement, however, should be permitted. The longer this stage was prolonged the greater the mobility was likely to be, but the position of the limb should be carefully observed and the progress of healing checked by X ray examination. When the patient got up he should wear a short celluloid spica or similar splint and be allowed to walk on patten and crutches. When he was in bed the spica need not be worn and he should be allowed to move the joint if any movement was possible. Especially when the joint was fixed it was important that he should be seen every week for a considerable period after the spica had been omitted lest flexion deformity occurred.

Other Methods.

Mr. T. P. MCMURRAY (Liverpool) said that after Mr. Pugh's remarks it might be forgotten that the disease was not confined to the young but could occur at any age. This fact must not be overlooked. The diagnosis was usually made easily from the presence of rigidity in every direction, and should be followed by immediate and complete fixation. He employed a frame with fixed extensions in a recumbent position for a period, which varied according to the nature of the case. In the absence of a sinus, fixation lasted from 15 to 24 months. The period of recumbency came to an end when pain had been absent for six months. He considered a frame to be better than plaster as a means of fixation in the early stages since it permitted heliotherapy. Too great a degree of abduction should not be aimed at on account of the scoliosis and pain which might be produced. As regards the operative treatment, he considered that the mortality was so high that operation was never justifiable in uncomplicated cases of this disease which, as Ford remarked in 1792, was rarely fatal, unless a sinus and secondary infection occurred. With regard to abscesses, he found that the progress of many was checked by mere fixation of the joint, and only rarely was he forced to aspirate. In the latter event he usually made injections of one of the many fluids which were recommended, and he considered this exercised a beneficial effect. In the presence of a sinus leading to a detached and carious femoral head he operated and removed the head, but did not interfere with the tuberculous granulation. Other factors in the treatment were open air, and sunlight or artificial light in winter. The end-results that might be obtained were either bony ankylosis from complete destruction of the joint surfaces, or fibrous ankylosis either fixed or permitting a very limited range of movement which was frequently painful. Of these he considered bony ankylosis to be the better result. In his opinion cases which recovered with a complete restoration and perfect functional mobility of the joint had been erroneously diagnosed as tuberculous.

The PRESIDENT considered that it was quite possible to obtain perfect functional mobility in certain cases of tuberculous hip disease, for he had seen such cases recur after an interval and progress in the usual manner. One of Mr. Pugh's cases, however, he regarded as a case of cystic disease of the head of the femur, and in a similar case he, the President, had had a good result from operative treatment. He was quite sure that there was a place for operative treatment in certain cases, and he quoted a case in which excision of the head of the femur 15 years ago and dislocation of the neck on to the dorsum ilii had resulted in a cure with bony ankylosis. The patient was now able to walk 10 or 15 miles. Arthrodesis was not possible, or at least not safe, in the early stages of the disease, but was called for particularly in the later stages in adolescents or adults. It might then give the best possible result.

Sir HENRY GAUVAIN agreed almost entirely with Mr. Pugh as regards the possibility of complete recovery, but thought that there were still a number of unclassified diseases which resembled tubercle (of which Calvé's pseudo-coxalgia was only one) which responded admirably to the ordinary treatment of a tuberculous joint. In the local treatment he found that plaster moulded around the condyles afforded a good purchase for extension while leaving the knee free. If the knee were not allowed this freedom "genu recurvatum" and the condition he called "dimpled" tubercle, in which the patellar tubercle was replaced by a depression, were apt to occur. To ascertain when the patient might be allowed to sit up, he employed rotation of the femur in a jerky manner: so long as this produced spasm spreading to the abdominal muscles, recumbency was necessary. He could show cases which exhibited a complete return of function after having had abscesses in which the tubercle bacillus was demonstrated. Sea-bathing was an admirable adjunct to heliotherapy in quiescent cases.

Mr. H. A. T. FAIRBANK pointed out that if the diagnosis were made early the disease was outside the joint. In these cases, and in cases of synovial disease, it was quite possible to get a movable joint. As regards the need of flexion, he agreed that 35° was an admirable compromise, but thought it safer to aim at less flexion than was really desired, otherwise it might be difficult to prevent ankylosis at a right angle. Adduction would often recur after correction; in obstinate cases he had once or twice performed exsection of the obturator nerve by the extra-peritoneal route. He had X ray pictures which showed the adduction occurring at the epiphyseal line. In his experience true bony ankylosis was a very rare result in this disease.

Mr. ACTON DAVIS had seen a tuberculous hip recover with complete mobility. As he then regarded the case as not tuberculous the usual scheme of treatment was not carried out, and the child reappeared some time later with recurrence of the disease. He emphasised the fact that the functional results of

treatment might be very good in cases exhibiting flexion and adduction, which anatomically could only be described as bad.

Mr. P. B. ROTH thought that the hip-joint was the joint which reacted best to heliotherapy. As a test of cure, he preferred a return of the normal density of the head of the bone to the Gauvain spasm test. He agreed with speakers other than Mr. McMurray as regards the treatment of abscesses and the desirability of a small angle of flexion. In his opinion the weight of the limb produced the necessary traction when Thomas's hip splint was used in the upright position.

Mr. MCCRAE AITKEN thought that synovial tubercle often recovered with a movable joint, but such cases were apt to suffer bone infection later. He had now come to the conclusion that some form of arthrodesis was the best form of treatment for old painful fibrous ankylosis or unstable joints with destruction of the head.

Mr. PUGH and Mr. MCMURRAY briefly replied.

ABERDEEN MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held on April 3rd, Dr. G. M. DUNCAN, the President, being in the chair, when Dr. G. MATTHEW FYFE read a paper on the

Treatment of Gonorrhœa in the Male.

After a brief sketch of the history of the disease and the anatomy of the parts, Dr. Fyfe pointed out that it was only to-day that organised scientific effort was being made to combat the evil, and went on to discuss the subject under three heads: (1) the abortive treatment of gonorrhœa; (2) the treatment of acute, subacute, and chronic gonorrhœa; (3) the standard of cure. The abortive treatment might be early or late, according as it was applied immediately after exposure, when the organism might or might not be present, or during the period of incubation, or applied when the disease had just become manifest. If the patient asked for advice after having run the risk of infection, but without showing any definite symptom, an attempt was first made to arrive at a diagnosis by microscopic examination of scrapings from the navicular fossa, and the urine was examined to exclude the possibility of recurrence of an old infection. Twice daily irrigation for three days was then instituted with two pints of a 1/8000 alkaline solution of potassium permanganate. The parts were anointed with calomel ointment, the penis strapped up, and an alkaline diuretic mixture given. If the patient presented himself with a discharge of not longer than 24 hours duration, after a proper diagnosis one of two treatments was used: either irrigation with two pints of 1/4000 alkaline potassium permanganate solution and the immediate injection of 10 per cent. argyrol or lunosol twice daily for four days, and then irrigation alone for another four days; or the sealing into the anterior urethra of 5 per cent argyrol or 10 per cent. lunosol for six hours daily for five consecutive days. Both these methods were found eminently successful, but Dr. Fyfe pointed out that the eligible patients were few.

For the treatment of acute gonorrhœa Dr. Fyfe emphasised the necessity of a careful diagnosis between anterior and posterior urethritis. Instrumental interference for diagnosis was not recommended in acute cases, as the simple two-glass test was found sufficiently reliable; palpation of the prostate should be a routine. Every effort should be made to prevent an anterior urethritis from extending posteriorly. The general treatment of acute gonorrhœa, which was highly important, consisted in confining the patient, if possible, to bed, on a bland diet with copious draughts of water, alcohol in any form being strictly forbidden, rest, hot hip baths, suspension of the parts by a T-bandage, regular evacuation of the bowels, and large doses of an alkaline diuretic with hyoscyamus and buchu. The local treatment consisted in anterior irrigation, preferably by means of a can and nozzle. The findings at the Aberdeen Clinic were in favour of anterior irrigation solely, the most useful fluid being a solution of potassium permanganate rendered alkaline by the addition of sodium carbonate, commencing with a dilution of 1/8000 gradually increased to 1/4000. If the subacute stage became prolonged, a change might be made to zinc sulphocarbolate, 1/4000, or to mercury oxycyanide 1/4000. The irrigation should be continued daily till the discharge had ceased or was manifest only as a morning drop—a stage usually reached in three or four weeks, when the irrigation could be gradually discontinued. In acute gonorrhœa the use of detoxicated vaccines had not been good. In the treatment of acute posterior urethritis the rules of general treatment should be strongly impressed; it had been found wiser not to begin posterior irrigation till the acute stage had subsided. A constant watch should be kept on the prostate in these cases. In all acute cases instruments and medicated bougies were to be avoided. The treatment of chronic gonorrhœa was a lengthy and often disappointing process, but modern methods, methodically and rationally applied, would cure almost every case. The secret of success was exact diagnosis, and only after all foci had been located should treatment be applied. The importance of regular prostatic massage was emphasised, and Dr. Fyfe described the use in diagnosis and treatment of such instruments as the urethroscope, the exploratory olivary bougie, the straight sound, the Kollman dilator, the suction apparatus of Mills, and the Ultzmann syringe. Treatment by vaccines alone was neither rational nor successful, though a better response to this treatment was obtained in chronic prostatitis than in any other condition of the chronic stage.

Complications and their treatment were then briefly dealt with, special mention being made of the magical effect of intravenous injections of electrargol in epididymitis, and finally Dr. Fyfe discussed the standard of cure. The four tests used in the Aberdeen Clinic were: examination for discharge, examination of the urine, examination of the prostatic secretion, and examination by the urethroscope. These tests should be applied at the completion of treatment, and then at monthly intervals for three months. Accessory tests were the provocative vaccine test and the complement-fixation test.

Discussion.

In the subsequent discussion there took part Mr. G. H. COLT, who referred to his experiences in treatment of the disease in Constantinople during the war, and pointed out the early symptom of itching of the glans penis; Dr. WILLIAM CHRISTIE, who emphasised the difficulties experienced in treating cases of gonorrhœa in private practice; Dr. R. RICHARDS, who stated that he had found the use of detoxicated vaccines helpful in the acute cases; Dr. GEORGE ROSE, who inquired as to the value of sandal wood oil; and the PRESIDENT, who in summing up the discussion laid great stress on the importance of the strict observance of the standard of cure and on the value of the urethroscope in diagnosis and treatment.

HUNTERIAN SOCIETY.—It has been decided that the annual award of the Hunterian Society medal, which for some years has been in abeyance, shall be re-established. The medal is awarded for the best essay on any subject which shall be submitted by any general practitioner resident within Great Britain, Ireland, or the Channel Islands, "whether Fellows of the Society or not." Essays should be sent to the hon. secretary, Dr. A. E. Mortimer Woolf, at 94, Harley-street, W., not later than Dec. 31st, 1924. The medal will be presented at the annual dinner of the Society in February following. The medallist will be expected to read his essay at the annual general meeting of the Society. The hon. secretary will forward all particulars to anyone desiring them.

Reviews and Notices of Books.

DISEASES OF THE NERVOUS SYSTEM.

A Text-book of Neurology and Psychiatry. Fourth edition. By SMITH ELY JELLIFFE, M.D., and WILLIAM A. WHITE, M.D. With 475 engravings and 13 plates. London: H. K. Lewis and Co., Ltd. 1923. Pp. 1119. 2 guineas.

THE general plan of this well-known text-book, now in a merited fourth edition, is based on the conception of a division of nervous activities into three groups—vegetative, sensorimotor, and psychical—with corresponding defects of function which concern the endocrinologist, the neurologist, and the psychiatrist. Each constitutes a study and a specialty in itself, and if there are, in fact, comparatively few who claim to be experts, yet a working knowledge of each is requisite for success in the practice of any of the three. Aside from this standpoint, moreover, it is scientifically legitimate to claim that the different levels of dysfunction are but manifestations of impairment in a single unit—viz., the nervous system—conceived in its broadest sense. We have no sympathy with division of such morbid activities into watertight compartments which make passage from one to the other an unduly difficult proceeding; on the contrary, a text-book such as this serves a useful purpose beyond that which may be supposed to be its immediate purpose—it orients the inquiring mind in the direction of a conception of neural action one and indivisible, whatever form the outward expression of this action may take.

For its size the volume is sufficiently comprehensive for all practical uses; its many illustrations and tables facilitate its handiness from the viewpoint of descriptive neurology; there are numerous references to the literature to serve in further research. On the psychical side it is coloured by a definite Freudian cast, which is well illustrated in the statement that there is no pharmacotherapy for "genuine epilepsy"—in our opinion an unfortunate remark. The authors, however, are candid enough to see that a Freudian explanation of at least some mental diseases—e.g., dementia præcox—raises more difficulties than it lays. As far as the student is concerned we consider he should read the psychiatry section of the book with openmindedness, in view of the speculative nature of some of the authors' contentions; the professional reader will know just how much worth to attach to the more problematical of these.

TRAUMATISMES DU POIGNET ET RAYONS X.

By ÉTIENNE DESTOT, of Lyons. Paris: Masson et Cie. 1923. Pp. 174. Fr.16.

SOME 20 years ago there appeared a small work dealing with injuries of the wrist-joint which soon became recognised as the first complete and accurate radiological study of the various traumatic lesions which affect this region. During the years which followed its first publication, the author, Étienne Destot of Lyons, continued to assemble clinical and radiological records with a view to the production of a larger monograph on this subject. The manuscript was finished shortly before his untimely death in 1918, and it has fallen to the lot of four of his pupils to arrange for its publication. The wealth of material which forms the basis of the present work must surely be unique in the experience of a single observer. The book is divided into eight sections, as follows: (1) Anatomy and physiology; (2) sprains and scapho-semilunar subluxation; (3) fractures of the scaphoid; (4) dislocation of the carpus and mid-carpal luxation; (5) fractures of the semilunar; (6) uncommon fractures of other bones; (7) radio-carpal dislocation; (8) various types of fracture of the lower end of the radius.

The work may be regarded as a classic, and as time goes on much of its contents will be incorporated into the standard text-books of surgery and radiology. Until this happens an English translation would be of great value.

THE FORM AND FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM.

Second edition. By FREDERICK TILNEY, M.D., and HENRY A. RILEY, M.D. With 763 illustrations, including 56 coloured. London: H. K. Lewis and Co., Ltd. 1923. Pp. 1020. £2 12*s.* 6*d.*

THE favourable impression aroused by a perusal of this monumental work on its first appearance is substantiated on a glance through its new edition. There is little change from the earlier issue, except by way of incorporation of some helpful suggestions from those who have offered certain criticisms on various points. On the whole, it is strongest on the purely anatomical side; its physiology is based not a little on deductions from the clinico-pathological side—a method of great and undiminished value, but one which requires such amplification as it can obtain from the experimentalist. Detailed criticism would be out of place in a review of this character, for the technicalities of the work are of interest mainly to the neurologist and neuro-anatomist; our appreciation of the book, however, can be understood when we say it is more complete than Edinger's well-known "Vorlesungen," and much more modern than similar works that have been familiar to the student of neurology for the last 20 years.

DISEASE IN CAPTIVE WILD MAMMALS AND BIRDS.

By HERBERT FOX, M.D., Pathologist to the Zoological Society of Philadelphia. London and Philadelphia: J. B. Lippincott. 1924. Pp. 665. 60*s.*

THIS work is a careful record of observations and deductions made during the past 20 years on all the mammals and birds which have suffered from disease or died in the Zoological Gardens at Philadelphia. The number of post-mortem examinations upon which the records are based was 5365; of these, 1860 were on mammals and 3505 on birds. In nearly all the large zoological gardens of the world a record of the routine post-mortem examinations is kept, but hitherto no attempt has been made to correlate the results, and this is the first time that such a record has ever been placed in a compact form before the members of the medical and veterinary professions. The original object of the work was the pursuit of knowledge for its own sake, but there is no doubt that the results have been of great practical value in the management of the Philadelphia gardens; hygiene has been improved, disinfection has been made scientific, epidemics have been arrested, and some diseases (e.g., tuberculosis in monkeys) have been entirely eliminated. Throughout the book the reader will be impressed by the way in which pathological findings are brought to bear on the diagnosis, treatment, and prophylaxis of disease. The relation of diet to disease is fully discussed in a chapter by Dr. E. P. Corson-White. An interesting table is given showing the pathological findings in relation to the dietary habits of animals. Birds and mammals which live on a mixed diet of plant and animal tissue show a lower percentage of disease of the digestive organs than those whose diet is purely carnivorous or herbivorous. Thyroid disorders are almost entirely confined to the carnivora; likewise the percentage of rickets was highest in young carnivora.

The section dealing with the incidence and significance of animal parasites emphasises the value of parasitological studies in zoological gardens, both in relation to the animals and to human beings. The early examination of the fæces of newly arrived animals for helminth eggs, and the subsequent treatment of infested cases with vermifuges, have considerably diminished the cases of parasitic enteritis and other disorders which are directly due to parasitic worms. Research on the morphology and bionomics of

helminths collected after death from wild animals is being carried out at several of the larger zoological gardens, notably London and New York, and much fresh light is being thrown upon some of the common helminth infections of man by means of the study of comparative material. There is no doubt that researches upon other groups, of which a zoological collection offers a large variety, would be productive of similar good results.

The subject of tuberculosis in monkeys is dealt with at considerable length, especially from the diagnostic point of view. Owing to the difficulty in obtaining physical signs or demonstrating the tubercle bacillus in these animals, the tuberculin test is employed on every new arrival or suspected individual. Mixed bovine and human tuberculin is used, the initial dose for a monkey weighing 10 lb. being 1 mg. The variations in temperature are then taken per rectum at four-hourly intervals for 48 hours. In healthy animals there is no reaction; in tuberculous animals there is usually a definite rise in the first 12 hours, followed by a fall and a subsequent rise during the second 24 hours. The temperature of a healthy monkey is highest in the daytime during the period of greatest activity, and drops at night when the animal is at rest. Great reliance is placed on this reaction by the author, and animals which are found to be positive are not allowed to be placed on exhibit. The skin and eye tuberculin tests have been tried, but do not give reliable results. The chapter on neoplasms contains two valuable tables, one showing the type of tumour and organ of origin, the other showing the incidence in relation to sex, breeding, duration of captivity, metastases, embryological origins, and order of animal affected. The incidence of new growth was found to be highest among the rodentia and lowest among the primates, the marsupialia and carnivora came second and third on the list. The main organs affected were uterus, liver, thyroid, and mammary glands, in this order. In birds the kidney was found to be the commonest site of a primary growth. There are in all 28 very valuable statistical tables dealing with the incidence of disease, analysis of diet, and weight ratio of organs.

This is a book which merits the attention not only of the administrative staff of every zoological garden, but also of everyone interested in human and comparative pathology.

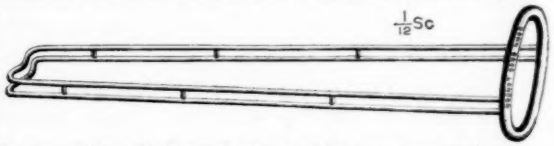
JOURNALS.

JOURNAL OF INDUSTRIAL HYGIENE.—The January number reports the proceedings of a joint meeting held in Buffalo between the American Association of Industrial Physicians and Surgeons and the Health Service Section of the National Safety Council. It contains a series of articles by industrial doctors dealing from experience with various aspects of occupational medical service. All are of interest, but the most useful is a description of the service established by the Endicott-Johnson corporation, employing 16,000 shoemakers. The service is complete and covers medical attention at work and at home. Each worker is examined on engagement and again six months later. A medical staff is always on duty during working hours; the medical centres had 90,000 calls in 1922, and the ambulance was in use 5000 times. A well-attended baby clinic for children of the workers is held weekly, of which pre-natal work is a feature. Dental and eye work is carried out. Nose and throat work is a specialty. The staff doctors paid 75,000 visits in the year to homes and the nurses 15,000. Convalescent homes for girls and for men are maintained. The total cost of medical service is placed at nearly $400,000 for 1922. The result is a family of happy, contented workers, who produce more finished material per worker than any similar group and have a very low labour turnover; labour disputes are unknown.—G. M. Price contributes a preliminary paper on the physical examination of 50,000 garment workers. The observations were made at the Union Health Centre, a unique, well-equipped clinic in New York, operated by workers on a self-supporting coöperative plan. One dollar is charged for examination and treatment; selected physicians received $7.50 for one and a half hours' attendance. Applicants for admission to the Garment Workers' Union are all examined medically. Only 45 out of 36,510 were rejected, but many were accepted on limited sick benefit. Two per cent. had some respiratory trouble, 1·5 per cent. had chronic heart disease, 15 per cent. gastro-intestinal disease, and 25 per cent. neurasthenia. Interest also attaches to the discussion notes referring to the papers read.—The February number contains an article dealing with physical examinations, with follow-up work, in a department store, by C. A. Swan and E. B. Emmons, which shows that only 29 per cent. of those examined had no defects, and that among the remaining 71 per cent. defects were found averaging nearly two per person. The authors hold that physical examinations are the first step in industrial preventive medicine and that the expense incurred is entirely justified by the results obtained in returns to the establishment.—D. R. Wilson contributes a valuable article on industrial lighting, in which he summarises in readable form the investigations which have been carried out by Government inquiry. The installation of lighting primarily is a question for the architect, but the standard to be attained is one which must be laid down by physiological research.—The action of irritant gases upon the respiratory tract is ably summarised by H. W. Haggard. He brings together available knowledge with regard to the various irritating gases which may occur industrially, and states the concentration at which they become dangerous, and the symptoms which result.

New Inventions.

AN IMPROVED SPLINT FOR FRACTURE OF THE FEMUR.

THE routine treatment of fractured femurs, excluding the use of calliper traction, has not always yielded satisfactory results. At the present time extension by means of adhesive plaster with the limb supported on a Thomas or Hodgen splint is probably the method most in use. Quite frequently, however, there is some displacement of the fragments which extension fails to cure, and I have lately used a modification of the ordinary Thomas's knee splint, which has proved useful



in correcting displacements which have persisted after reduction of the fracture and fixation by extension. As the illustration shows, the alteration consists in the addition of an extra bar fixed to the ring of the splint. Small metal struts maintain the distance between the two bars. The limb is supported on one ring and, by suitably arranging bandages on the upper bar, any lateral or antero-posterior displacement may be corrected. Thus where the upper fragment is adducted and flexed a bandage placed over it under the top bar and pulled tight will control the flexion. The use of a splint slightly bent at the knee is an additional aid. To overcome the adduction another bandage encircles the thigh above the site of fracture and is used as a lever with the outer bar as a fulcrum. A similar bandage is applied in the opposite direction below the site of fracture. The advantage of the extra bar is that it affords more opportunity for simple manipulation than the conventional single bar. The bandages should be of stout material, such as drill.

Messrs. Down Bros. are the makers of the splint.

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THE LANCET.

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MATERNAL MORTALITY IN CHILDBIRTH.

THE publication of the Ministry of Health report by Dr. JANET CAMPBELL upon the results of an inquiry into the question of maternal mortality must serve to concentrate attention upon one of the most serious problems which confronts the medical profession to-day. Whilst the general death-rate has been reduced since the beginning of this century by almost one-third, and the infant mortality-rate during the first year of life actually halved, it is a matter of concern that the maternal deaths associated with childbirth are practically the same to-day as they were 20 years ago. That the problem is very real will be appreciated from the fact that approximately 3000 mothers in England and Wales lose their lives annually from what should be a purely physiological function. In a recent issue [1] we reviewed briefly Dr. CAMPBELL'S work, but the importance of the issues involved calls for a further reference to this valuable and painstaking report, a document which should be in the hands of all interested in the well-being of women and children, and which for this reason has been issued at the modest price of 1*s*.

The factors in the causation of this excessive mortality, as the report points out, are numerous and complex. Puerperal sepsis in its various forms accounts for by far the largest number of deaths. Next in order come the toxæmias of pregnancy, and finally, hæmorrhage takes its toll of victims. In all these conditions it is obvious that factors are at work which, in the words of the report, "are more or less directly controllable and should be controlled." In other words, the problem with which the country is faced is rather one of organisation and education than of principles directly concerned with current obstetric practice. That it is possible to conduct midwifery satisfactorily, and with little or no maternal mortality, even in the humble and insanitary dwellings of the very poor, is proved conclusively by the reports of the extern departments of the various lying-in charities. In the clinical report of the Rotunda Hospital for 1922–23 recently issued we note that in the extern department in a series of 1824 cases the maternal mortality was 0·21 per cent. In the same report, dealing with the intern department, Dr. G. FITZGIBBON calls attention to the evil results of bad midwifery in the following words: "Several cases were admitted in a moribund state, while five were admitted profoundly septic after protracted or complicated labour." Of considerable interest in this connexion is Dr. CAMPBELL'S observation that insanitary surroundings have probably much less direct influence upon puerperal mortality than is generally supposed, and that unless infection is introduced from without it does not appear that a woman who is accustomed to a low standard of living is more prone to develop sepsis after an ordinary confinement than one in a more hygienic dwelling. Even if this is the case, there can be little doubt, however, that uncleanliness and insanitary dwellings may and do spell disaster in the event of any obstetrical operation being necessary. The practitioner confronted with the treatment of a difficult complication in the presence of insanitation, overcrowding, deficient water-supply, or lack of effective lighting cannot apply those surgical principles which are so essential to prevent disaster. It is in this connexion that adequate antenatal supervision is so all-important. In the prefatory note by Sir GEORGE NEWMAN to the Ministry's report the fact is made abundantly clear that no sound progress can be made in the reduction of maternal mortality apart from antenatal supervision. It is an astonishing fact that the event of childbirth, the most clearly foreseen of all "illnesses," is inadequately prepared for. How often does an expectant mother "book" with her selected doctor, midwife, or maternity home, but fails to submit herself to the only safe method of control—namely, systematic antenatal supervision?

Antenatal supervision implies a competent knowledge of all the accidents that may befall a woman during her pregnancy and labour, and this requires a very thorough training not only in theory but in practical obstetrics. The General Medical Council has taken cognisance of this fact in its recent recommendations and resolutions in respect of the professional examinations, assigning to the training of midwifery and gynæcology a status not inferior to that of medicine and surgery. The medical schools are to-day taking steps to put these resolutions into effect, and the practitioner of to-morrow will not be able to say that he was taught surgery which he never practised and that he practised midwifery which he had never been taught. With improvements in the education of the medical student, a better training of the midwife must go hand-in-hand. Inasmuch as the responsibility of the maternal welfare is shared equally between the medical profession and the midwives, it is of the highest importance that the training of the latter should qualify them adequately to accept such responsibility. Since the passing of the Midwives Act in 1902 it is a matter for regret that so little improvement, if any, has been noted in the maternal statistics. In a series of 256 unselected cases of puerperal fever recorded by Dr. CAMPBELL, in an appendix to her report, it is noted that 102 cases occurred in the practice of midwives alone, as against 86 in which delivery was effected by a doctor. Figures such as this point to the importance of securing for a pupil-midwife the best possible training over a sufficiently long period. What this period should be is a question which has continued to engage the attention of the Central Midwives Board since the Midwives Act was passed. There is no doubt that the original period of three months' training was inadequate, and it is perhaps questionable whether the present revised regulations are sufficiently stringent to deal with the grave problems involved. When it is remembered that puerperal sepsis is the main cause of maternal mortality to-day, and that it takes the medical and nursing professions many years to assimilate the tenets of antiseptic and aseptic technique, it is asking a great deal of an uneducated woman to accept and practise those canons at the end of a few months' training. We are in absolute agreement with Dr. CAMPBELL in aiming at the total abolition of the so-called handy woman, and with the suggestion that there should be much closer coöperation between the doctor and the trained midwife. Coöperation on the lines suggested by Dr. JOHN FAIRBAIRN of shifting to the midwife those parts of medical service which are least essential, and relieving her of the responsibilities of those which are most essential, would go a long way in removing many evils which at present

[1] THE LANCET, April 5th, p. 716.

exist. Every prospective mother should have the advantage of a considered medical opinion during her pregnancy, although the actual conduct of normal labour might safely be left in the hands of an efficient midwife. In other words, it is the duty of the medical profession to prevent disaster, and prevention can only be secured by adequate preparation and supervision. Midwifery so conducted should not unduly tax the time of any doctor, since antenatal and postnatal observations can, in the words of the report, "be carried out without conflicting with the claims of other patients"; a very important factor in the day of the busy general practitioner. By contrast the time and energy that have to be devoted to coping with individual cases which, for whatever cause, have been allowed to progress too far without supervision is great indeed. Such cases form the bulk of those to which the practitioner is summoned by the midwife in distress, and we propose shortly to issue a special supplement designed to help him to deal with them. With the adoption of an improved antenatal and midwifery service on coöperative lines between midwives and practitioners, increased facilities must also be provided for dealing with obstetric problems. Where danger is anticipated there should be no obstacle in securing the services of adequate assistance whether it take the form of accommodation of a hospital bed, the provision of efficient nursing, or the help of a skilled obstetrician.

The report of the Ministry calls attention to the fact that the returns of large cities such as Birmingham, Manchester, and Liverpool, where maternity work has been organised over a long period, show that systematic efforts over the whole country would undoubtedly lead to an appreciable saving of maternal life and health. It should not be impossible to overcome the financial and other difficulties involved in the building of a complete maternity service. A great deal has been accomplished within recent years in the reduction of infant mortality, and it can be anticipated with confidence that a similar concerted effort would result in a like benefit to the mothers of the nation. Dr. CAMPBELL is to be congratulated upon the work she has accomplished in accumulating such a mass of evidence and putting it forward in such a convincing manner.

THE THERAPEUTIC SUBSTANCES BILL.

ON April 8th the Therapeutic Substances Bill was read a second time in the House of Lords. Under its provisions the manufacture and sale, by those who are not medical men, of vaccines, sera, salvarsan and its substitutes, insulin, and pituitary extract can only be carried out in this country under licence granted by the Minister of Health, and importation from abroad is restricted in conformity. Few of the many vaccines, sera, toxins, antitoxins, and antigens are at present capable of accurate titration. The potency of diphtheria and tetanus antitoxins, however, can be determined with a high degree of accuracy. In respect of these substances, powers similar to those sought for under the proposed Bill were secured in Germany in 1896 and in the United States in 1902. Diphtheria toxin to be used in the Schick test for susceptibility and toxin-antitoxin mixtures for immunising purposes should also be carefully evaluated before they are sold. There are, as yet, no accurate well-established methods for determining the potency of therapeutic sera such as anti-dysentery serum and anti-pneumococcic serum, and in the case of vaccines all that is possible at present is to determine the number of organisms in a certain volume of the preparations. The firms manufacturing antitoxins and vaccines in this country are of high reputation and have supplied trustworthy products for many years, so that it may appear that the need for the control of the supply of these substances is not urgent. At any time, however, similar products may be imported from abroad, and in the absence of such legislation as is contemplated there is no means of ensuring their purity and potency. There is reason to suppose that steps to control all these preparations will be welcomed by British manufacturers.

For the remaining substances, except pituitary extract, control of a temporary nature exists already; a fortuitous circumstance has in the case of salvarsan and insulin enabled advantage to be taken of the patent laws to obtain a check on the manufacture. In the case of salvarsan, the circumstance was the outbreak of war; at that time the supply of German salvarsan was cut off, and British manufacturers who had facilities for making it applied to the Board of Trade for licence to do so, in order to protect themselves from the possibility of post-war litigation for infringement of German patents. It was made a condition of holding such licences that the products should be subjected to biological tests designed to exclude unduly toxic samples, to be carried out by the Medical Research Council. After the war this arrangement came to an end, and as a result of Board of Trade negotiations the manufacturers continued production with licences granted directly by the German patentees. Biological control of salvarsan and neo-salvarsan would then have stopped but for the circumstance that the Ministry of Health was the largest purchaser of these substances; on this account the German makers were induced to insert in their licence to British manufacturers a clause providing for biological control of all products of this nature. At present, therefore, the accident of the war has enabled the Ministry of Health to persuade the German patentees to demand from the British makers biological control. To such circuitous courses does the absence of legislation lead. However, in a short time the salvarsan patents expire, and, as matters stand, the present checks will disappear; those who are familiar with the reports of the Salvarsan Committee are aware that it will be easy in that case for serious changes in the toxicity and therapeutic value of the preparations to occur, however carefully and conscientiously the chemical preparation is effected.

Control exists at present also for insulin, but again because of the accident that the original patent-holder is the University of Toronto, a body concerned to see that the manufacture of insulin is carried out for public rather than private interest. The patent rights in this country were offered to and accepted by the Medical Research Council for the very reason that as no legislation such as this Bill contemplates existed in England, it was only by holding these rights that any control over the efficiency and uniformity of the product sold could be maintained. There are those who have expressed doubts whether the part played by the Medical Research Council made for a rapid and adequate supply of insulin to diabetics; to such we may recommend an inspection of the state of affairs in France, where, in the absence of central expert control, the insulin supply still remains inadequate, untrustworthy, and expensive. It is not sufficiently realised that the large-scale manufacture of products such as insulin and pituitary extract is a comparatively new problem, which is almost as much outside the realm of a pure chemist as is a surgical operation, so that even the large manufacturers of drugs have been for the most part without the skill and experience necessary

to deal with it. For pituitary extract there is at present no control, consequently the position as regards uniformity of potency is chaotic. A year and a half ago a report of the Medical Research Council stated that of five samples supplied on request by different manufacturers, the activity, as tested by the power to produce contraction of plain muscle, varied from 80 to 1. The reason for this discrepancy was in part due to the absence of a standard, and in part to the lack of any indication from the clinicians to the manufacturer of the suitable strength at which extracts should be made. At a conference in Edinburgh in July last of the leading pharmacologists of all countries (under the auspices of the League of Nation's Health Committee) to discuss international standards for biological products, a standard for pituitary extracts was adopted for investigation. If subsequently this standard is recommended by the League of Nations to the different governments, such recommendation, so far as this country is concerned, will be useless unless the provision in the Therapeutic Substances Bill becomes law.

We need not dwell further on the dangers arising from the present position. It is not surprising that accidents are reported in the use of pituitary extract in obstetrics when so wide a variation exists between the potency of different preparations; it is clear that a practitioner, accustomed to the use of one preparation, who for some reason changes to another, runs a serious risk of administering a dose much larger or much smaller than he intends. Practitioner and patient alike require the protection which this Bill proposes to confer.

PUBLIC HEALTH WORK BY THE LEAGUE OF NATIONS.

THE Covenant of the League of Nations established a machinery for bettering relations between Governments and for coördinating their action, not only in connexion with questions of keeping the peace, limiting armaments, and the many other political functions with which the League is ordinarily associated, but also in the work of the different technical organisations which have been set up under its auspices. It was fitting, therefore, that the Minister of Health should have been present at the lecture given by Dr. L. RAJCHMAN at the Royal Society of Medicine last week on the Health Organisation of the League, and should have introduced the subject by a most instructive preliminary address from the point of view of his Department and of the British Government generally. Mr. WHEATLEY drew attention to the fact that the formation of the Ministry of Health five years ago carried with it a closer association between the Government and medical and health questions than had existed previously; not only in his own department but in those specially concerned with medical research and the hygiene of schools and factories, all of which must be taken into account when reviewing the position of public medicine as a whole in this country and its relations to the State. Every one of these developments involves fresh points of contact with corresponding work in other countries, sometimes administrative when international understandings and agreements are needed, but more often educative, to make the experience of one country available for the others. While medical science has always been truly international and its practitioners have found their own ways of learning from abroad with little or no aid from the State, there are certain spheres in which there can be no question of the advantage which can be derived from the existence of an effective method of bringing together the different national public health services in the way which the Health Organisation of the League of Nations is now attempting. The establishment of a suitable body for this purpose has required some little time and negotiation, but it may now be regarded as completed, thanks to the fortunate arrangement by which the League will now be able to utilise the work and experience of the Paris International Health Office as part of its organisation; and it has already started with two exceptional advantages; the participation of the public health services of countries which ordinarily are thought of as being outside the League of Nations—the United States, Germany and Russia; and the special interest of the Rockefeller Foundation, which has supplemented the League's slender budget for health purposes (about £33,000) by donations for particular purposes.

Dr. RAJCHMAN was able in his lecture to outline the work which now lies before this Organisation and to speak of some results already achieved. The multifarious activities to which he referred appear to have become capable of this broad classification: (1) international agreements on health questions; (2) "standardisation"; (3) the comparative study of disease; (4) educational courses; and (5) official international coöperation for the prevention of epidemics. It is well known that the last-named of these activities bore very good fruit in Eastern Europe in connexion with the recent great epidemics in Soviet Russia, and it is satisfactory to learn that this type of work is to be extended to deal with the very notable increase of malaria which has taken place during the last two years in that country and in the Balkan States. Among the recent international agreements which already stand to the credit of the International Health Office is that which provides for the gratuitous treatment by modern methods of sailors suffering from venereal diseases at different ports of the world, the revision of the International Nomenclature of the Causes of Death, and a great deal of preparatory work in anticipation of the much-needed recasting of the International Sanitary Convention of 1912, the principal document governing the practice of quarantine. The work of "standardisation" is exemplified by the arrangements for joint expert studies and conferences which have led to the uniform adoption of the Ehrlich standard for diphtheria antitoxin, and have already brought us much nearer to general agreement on units and tests for various other therapeutic serums and products, including the glandular preparations which were specially studied by the League of Nations Health Conference last year in Edinburgh with the active participation of the Medical Research Council. Similar progress has been made with the comparison of values of the Wassermann and flocculation tests for the diagnosis of syphilis, recently carried out by representative bacteriologists at Copenhagen under the direction of Dr. TH. MADSEN. The nature of the educational courses has been illustrated during the last two months by the visit of some 50 foreign medical officers, from 25 different countries, to take part in a system of demonstrations of British health work organised by the Society of Medical Officers of Health; demonstrations which besides general public health work have included the specialist requirements of tuberculosis officers and school medical officers. A number of similar courses in which British medical officers have participated have already been held in foreign countries, and this year these will be continued in Switzerland, Holland, and Denmark

while, as a further development of the same principle, arrangements are being made for conferences of medical statisticians for mutual study of the conditions under which the vital statistics of different countries are obtained. As one outcome of these statistical comparisons the Health Committee of the League has appointed a subcommittee, with experts attached, to investigate the causes of certain notable variations in death-rates from cancer, as reported from different countries.

It must be concluded from Dr. RAJCHMAN'S lucid account that a goodly number of vessels have been launched and that some of them will have a long and difficult course before they come into port. But though the programme which the Health Organisation has set before itself is an extensive one, it clearly gives an indication of the work being pursued in a thoroughly practical spirit. It is encouraging, moreover, to note the care which seems to be given to the selection of those undertakings which are appropriate to the League of Nations machinery and can hardly be effected without it. Mr. WHEATLEY reminded the Society that the Organisation had its birth in the British Ministry of Health in 1919. The progress since made is greatly to the credit of the handful of public health administrators from different countries who then laid down the main objectives of the Organisation and have since given so much labour and thought to its development.

Annotations.

"Ne quid nimis."

RADIOGRAPHIC METHODS IN THE LOCALISATION OF SPINAL AND CEREBRAL TUMOURS.

THE complete diagnosis of tumours of the central nervous system is notoriously difficult. With spinal tumours the doubt arises as to the nature of the lesion, and consequently whether the patient can be relieved by operation; with cerebral tumours the chief difficulty is one of localisation. Hitherto we have been entirely dependent for localisation on our very incomplete knowledge of spinal and cerebral physiology, but recently two methods depending on radiography have been introduced—lipiodol injection, for spinal lesions, and pneumo-ventriculography for cerebral lesions. The injection of lipiodol into the spinal theca was first used by Sicard and Forrestier in Paris about a year ago and soon afterwards by Sargent in this country, and it has already been applied to a large variety of spinal cases. Lipiodol, a compound of iodine with a lipoid substance obtained from black-poppy pods, is a heavy fluid, very opaque to X rays, and apparently harmless to the nervous system. The method of using it consists in injecting 1 or 2 c.cm. by means of an ordinary lumbar puncture needle either into the lumbar theca, in which case the lipiodol is made to flow slowly towards the upper parts by tilting the subject, head downwards, at an angle of about 45 degrees, or between the occiput and the atlas into the cervical theca, in which case the lipiodol flows downwards. In either case any site of compression is shown radiographically by an arrest of the passage of the lipiodol, and the shape of the shadow produced may give important information as to the nature of the compression. The value of such a procedure is obvious: it may confirm or correct the "physiological" localisation, it may be of the greatest help in deciding the desirability of operating on a given case, and it may show the longitudinal extent of the compression which the surgeon has to deal with. The only danger attached to it arises when the sub-occipital site of injection is employed, and then it is that of sub-occipital puncture in general. The lipiodol itself seems to be innocuous; if no operation be performed it is allowed to remain in the theca and it gives rise to no symptoms; it is absorbed very slowly, if at all, for its presence has been demonstrated three months after injection. The difficulties of the procedure are merely those of taking X ray photographs of a patient in a slanting position, few X ray departments being equipped with tables that can be set at any desired angle. This difficulty can be overcome if the patient be placed in what Sicard calls "the position of the Mohammedan in prayer"; the injection can be performed and the radiograms taken in this position.

The procedure that has been introduced for cerebral radiographic diagnosis is pneumo-ventriculography. Its object is to show, by means of stereoscopic radiograms, changes in the shape of the lateral ventricles caused by the pressure of a tumour; and in order that the ventricles may be seen in an X ray photograph, the cerebro-spinal fluid in them is replaced by air. There are two very different techniques. Weed and Dandy, in America, introduced the method of direct puncture of the ventricle through a trephine opening in the parietal bone. With the patient lying on what was believed to be the affected side, they made a puncture on the other side of the brain and drawing off about 5 c.cm. of fluid at a time, they replaced it by air until 25–30 c.cm. of air were introduced; then they took a radiogram or set of radiograms; the patient's head was then turned over and the air made its way, via the foramina of Munro, into the lateral ventricle of the affected side, when a second skiagram was taken. The body of the ventricle might be greatly narrowed or completely occluded by a tumour in the parietal lobe, while tumours of the frontal, occipital, or temporal lobes would cause occlusion or distortion of the corresponding ventricular horns. Weed and Dandy claimed that by using this method they had not failed to localise any of a series of 200 cerebral tumours. The procedure has not found favour in this country; but, at the meeting of the Section of Neurology of the Royal Society of Medicine, reported on p. 803, Mr. Geoffrey Jefferson and Mr. A. A. McConnell were each able to give their experiences of it and to point out the difficulties. They found that in some cases the air did not find its way easily from one ventricle to the other and bilateral puncture had to be performed, that the amount of air introduced was insufficient, and that a definite mortality was attached to the operation.

An alternative technique comes from Germany and has been even less used in this country than the American method. At the meeting referred to, two speakers described varying success with it. In this method the puncture is made into the lumbar theca while the patient sits upright, and the cerebro-spinal fluid is drawn off 2 or 3 c.cm. at a time and replaced by air until 70–100 c.cm. of fluid have been withdrawn; then stereoscopic radiograms are taken of the skull. It is found that some air finds its way into the ventricles so that a ventriculogram is obtained. Such a procedure is certainly not free from danger, for in the case of tumours of the posterior cranial fossa the withdrawal of the spinal fluid is very liable to lead to the formation of a fatal conus cerebellaris. Yet one German neurologist has been able, obviously by a careful choice of cases, to perform the operation in 250 cases of various kinds without a fatality; in most cases there was no more untoward result than a severe headache, but in a few cases fits and febrile disturbances occurred. It seems probable that with improvement of technique some method of encephalography may lead to developments both in cerebral surgery and in our knowledge of cerebral physiology.

THE NURSE'S CURRICULUM.

AN inquiry from the chairman of the Committee on Nursing of the Buffalo Academy of Medicine concerning the attitude of the Public Health Committee

of the New York Academy of Medicine[1] on the matter of nurse training has led to a series of recommendations which will doubtless be regarded in certain quarters as reactionary. The report submitted by the committee emphasised the following points: 1. That the training course of nurses should be shortened considerably and should not cover a period of more than two years. 2. That there should be a revision of the curriculum, and that more stress should be laid on the acquisition of practical experience, and a better balance established between the various branches of nursing work than exists at present in actual practice. 3. That the first year of training should be so arranged that students who are compelled to discontinue their training for causes other than moral or mental deficiency may qualify as nurse attendants and should be eligible for licence examinations as such. 4. That graduate nurse attendants should be allowed to work in hospitals in order to increase further their proficiency and relieve the nursing shortage which now exists in many institutions. 5. That in planning a revision of the curriculum in nurse training schools the advice and guidance of the medical profession should be sought. The committee is likewise of the opinion that the Nurse Training School Council of the Board of Regents, in addition to its present membership, should include representatives of the trustees of hospitals. These suggestions are to some extent in line with the recommendations of the committee appointed by the Rockefeller Foundation.[2] This Rockefeller committee also recommends a reduction of the course at the hospital training schools to 24 months, preceded by four months' training in the basic sciences and in elementary nursing procedures; but this recommendation is dependent on the elimination of routine duties of no educational value and implies not a lowering, but a raising of standards. It is not clear whether the New York Medical Academy have designed their policy in the interests of the nurse or in those of the hospital service, for no suggestion is made that the shorter course should be more concentrated. Indeed, Clause 3, with its emphasis on the acquisition of practical experience, is not encouraging in this respect. Clauses 3 and 4, relating to nurse attendants, are unlikely to find favour in the nursing profession. While many agree that some sort of subsidiary nurse is needed by chronic cases who cannot afford and do not require the continued skilled attention of a fully-trained nurse, a rigid separation of the conditions under which they are taught is essential if confusion as to their status and competence is to be avoided.

THE WASSERMANN AND SACHS-GEORGI REACTIONS IN MALARIA.

Dr. G. Marcialis,[3] of the Medical Section of the Sassari Civil Hospital, reviews the literature, and records his observations on the Wassermann and Sachs-Georgi reactions in 225 cases of malaria, which were classified as follows: benign tertian, 44; quartan, 58; malignant tertian, 71; chronic malaria, 40; malarial cachexia, 12. Both the Wassermann and Sachs-Georgi reactions were negative in all the cases of benign tertian alike during the febrile attacks and in the intervals between the attacks. With one exception in which it was feebly positive during the attack, the Wassermann reaction was negative in all the 58 cases of quartan malaria, and the Sachs-Georgi reaction was negative without any exception in this group. The patient with a feebly positive Wassermann reaction was a child with no history or clinical evidence of syphilis, inherited or acquired. Of the 71 cases of malignant tertian the Wassermann reaction was strongly positive in five, both during the attack and in the apyrexial intervals, but these patients were also syphilitic subjects. In three with no history or evidence of syphilis it was feebly positive during the attacks only and not in the intervals. The Sachs-Georgi reaction was positive in ten cases, in five of which there was no history or evidence of syphilis during the attack and in five during the intervals. Both reactions were negative in all the cases of chronic malaria and malarial cachexia, during the attacks as well as in the apyrexial intervals. Injection of quinine in the syphilitic cases with the ordinary doses had no effect on the specific reactions in the serum, nor did the addition of large quantities of various quinine salts have any effect on the reactions of syphilitic serum in vitro. In connexion with this case allusion may be made to a fatal case of æstivo-autumnal malaria recently reported by Dr. G. McConnell,[4] of the Cleveland City Hospital. The patient was a man, aged 48, with a positive Wassermann reaction, in whom there was no clinical evidence of syphilis in spite of a history of infection 25 years previously. The necropsy, however, showed very definite syphilitic lesions of the aorta. Dr. McConnell remarks that previous statements to the effect that a positive Wassermann reaction may occur in malaria apart from syphilis were largely based on clinical examination only. The experience at the Cleveland City Hospital has been that when a necropsy has been performed on a patient with a positive Wassermann reaction veritable syphilitic lesions are always discovered.

THE ÆTIOLOGY OF SUMMER DIARRHŒA.

DURING the past decade or two widely divergent views have been put forward to explain the attacks of diarrhœa which infants are peculiarly susceptible to in the hottest summer months. Bacterial activity in milk before it reaches the consumer is held responsible for this kind of diarrhœa by some, while others trace it to the pyrexia which exposure to the sun may alone induce. Evidence in support of the latter view is put forward by Prof. ARVO YLPPÖ, of Helsingfors, in *Acta Pædiatrica* (1924, vol. iii., fasc. 2, p. 213). The incident which prompted his investigations occurred on a warm day early in May, 1920, when a dozen prematurely born infants were given an overexposure to the sun. All developed pyrexia, the temperatures of the three youngest infants, who were less than three months old, ranging from 39·6° C. to 40·5° C. Later in the same day they suffered from diarrhœa and vomiting. It seemed likely that the normal chemical reactions within the stomach and intestines had been upset by this bout of fever, and to throw further light on this problem Prof. YLPPÖ investigated the acidity of the gastric juice of several infants before and after the induction of pyrexia. He induced pyrexia by putting infants in a bath the temperature of which was gradually raised to 41°–42° C. After staying in this bath for 15 to 20 minutes, the infants were put in a hot pack which had been wrung out in water at a temperature of 45° C. In another series of experiments pyrexia was induced by the intracutaneous injection of calf lymph intended for vaccination. This lymph was diluted with sterile normal saline solution in the proportion of 1 to 10, and injected into the skin of the thigh at two points, 0·1 c.cm. being introduced at each point. The fever thus provoked occurred seven to ten days later, and lasted for one to five days. In both series of experiments it was found that a considerable proportion of the infants showed an appreciable lowering of the acidity of the gastric juice during the period of pyrexia. Prof. YLPPÖ suggests that even a temporary reduction of the acidity of the gastric juice provoked by a transient bout of pyrexia may prove fateful to the infant who happens to harbour pathogenic germs, such as those of the typhoid and dysentery groups, in the summer months. It has been shown that with a pH about 4 the gastric juice destroys these germs,

[1] Summary of the Activities of the Public Health Committee of the New York Academy of Medicine for the year 1923. New York City, 17, West Forty-third-street.

[2] THE LANCET, 1923, ii., 1203.

[3] Gazzetta degli Ospedali et delle Cliniche, Jan. 27th, 1924.

[4] Journal of the American Medical Association, 1923, lxxx., 1123.

and that with a pH about 5 the growth of these germs is considerably inhibited. In some of Prof. Ylppö's experiments the pH showed figures as low as 5·6–5·8, at which level of acidity the gastric juice exercises only a negligible bactericidal action on the germs of the typhoid and dysentery groups. These interesting observations afford some clue to the genesis of diarrhœa caused by parenteral injection or infection.

VACCINE TREATMENT OF EPIDEMIC ENCEPHALITIS.

AT a recent meeting of the Société de Thérapeutique of Paris, MM. A. Marie and Poincloux[1] reported the results of treatment of eight cases of Parkinsonism, following epidemic encephalitis, by intraspinal injection of the fixed virus of encephalitis. After removal of cerebro-spinal fluid, 1–5 c.cm. of a centrifugalised emulsion of the brain of a rabbit which had died of experimental encephalitis was injected. The emulsion represented a dilution of 1 in 20 of a virulent brain which had been kept in the ice-chest for 24–48 hours before use. The injection was followed by a rise of temperature ranging from 101·2° to 104° F., signs of meningeal irritation, cerebro spinal lymphocytosis, and a change in the clinical condition. The rise of temperature occurred 20 hours after inoculation, and lasted 24–36 hours, when the temperature fell to normal, except in two cases in which it remained between 100·4° and 102·2° for a week. The emulsion of a normal brain or of a virulent brain which had been inactivated by heat did not produce any rise of temperature. Signs of meningeal irritation consisted of pain in the head and spine, nausea, vomiting, pains in the limbs, and in one case Kernig's sign. The cellular reaction was always a lymphocytosis, which in several instances was very intense. Cases in which clinical improvement took place were those in which the temperature was highest and lymphocytosis was most marked. As regards results, two of the cases had to be excluded, as the patients refused further treatment after only two injections. Their present condition, however, is better than before, and at least tends to show the harmlessness of the method. Of the six others, two presented no improvement, while four had made remarkable progress. One patient in particular was able to get up, dress herself, read a little, and play the piano, which she had not done for four years. The writers suggest that even better results might be obtained if this treatment were adopted at the onset of encephalitis, and that it might possibly be of prophylactic service in epidemic times.

THE TREATMENT OF LEPROSY.

THE subject of leprosy engages more than ordinary attention and interest at the present moment on account of the energetic measures that are being taken for the eradication of this dread disease in the British Empire, and Sir Leonard Rogers, chairman of the Medical Committee of the British Empire Leprosy Relief Association, reviews in the March number of the *Tropical Diseases Bulletin* (Vol. XXI., No. 3) the recent literature dealing with the malady. The *Bulletin* further outlines the scope and object of the campaign against leprosy, showing how the medical policy is directed towards extending the application of improved methods of treatment throughout the Empire, not only by supplying the necessary drugs, but also by training those in charge of lepers to apply them. Researches on the ætiology and treatment of the disease are encouraged, and support is given to sound schemes of segregation. The method by which the work is carried out is illustrated by Dr. H. W. Wade, in a paper dealing with the Culion Leper Colony in the Philippines. Prior to May, 1921, he states, the staff was insufficient to enable any systematic treatment amongst the 4500 lepers to be undertaken, but in 1923 it was possible to record systematic observations on selected cases to the number of 4067. Intravenous injections of Rogers's original preparations were soon dropped on account of venous troubles, and in their stead chaulmoogra esters, plain or iodised, were injected intramuscularly. A survey on Sept. 30th, 1923, showed improvement in 55·9 per cent., while in a further 36 per cent. the disease had been checked; 6·4 per cent. of the cases showed retrogression, and in 1·7 per cent. of the total death occurred. Further progress of this crucial test will be watched with great interest. The principles underlying treatment are set forth in a paper contributed by Dr. G. E. Muir. He believes it is necessary to strengthen the body resistance and to induce repeated small reactions due to the breaking up and setting free of the bacilli in the tissues—a process which must be carefully controlled. A rise of temperature may be beneficial, and a case is quoted in which the leprotic lesions disappeared with the onset of kala-azar. Muir believes that injections of hydnocarpate esters into the skin lesions causes the most rapid improvement, and concludes that early and persistent treatment arrests the disease and causes gradual disappearance of the signs and symptoms. In an informative and careful study on prophylaxis, Rogers sums up the matter by saying that the main point is the avoidance of contact between lepers and healthy individuals, and, in order to do this successfully, cases must be detected in an early stage of the disease. Instances are given of the good effects which have resulted from segregation in Norway, Sweden, Iceland, and Eastern Canada.

CULTIVATION OF MICRO-ORGANISMS IN TISSUE PLASMA CULTURES.

S. B. Wolbach[1] and M. J. Schlesinger, encouraged by the work of H. Zinsser[2] and E. G. Carey on rat leprosy, have succeeded in obtaining what they believe to be a multiplication of rickettsia organisms in guinea-pig plasma-tissue cultures. The strain of Rocky Mountain spotted fever virus was maintained for over a year in guinea-pigs, while that of typhus was originally brought from Poland and was maintained by passage in the laboratories at Harvard. Special technique was devised, guinea-pig tissues being employed throughout: in the case of Rocky Mountain spotted fever the testicular and in the case of the typhus the brain tissues were used. Blood from half-grown guinea-pigs provided the source of the plasma and a technique was adopted which permitted the collection of blood, its centrifugalisation and a separation of the plasma with as few manipulations as possible. The tissue for cultivation was obtained with aseptic precautions and kept immersed in Ringer's solution until the plasma was prepared; then portions for culture were cut into pieces 0·5 to 1·0 c.mm. in size. When tissue cultures were transferred to fresh plasma, in order to prolong the period of growth, the pieces of tissue were removed from the plasma, washed in sterile Ringer's solution, transferred to fresh sterile cover-slips, and fresh plasma added. In this manner tissue cultures have been kept in active growth for four to six generations, over a period of four to six weeks. For injection into guinea-pigs the tissue cultures were teased into pieces small enough to pass through a No. 18 gauge hypodermic needle. The fragments of tissue underwent fairly prompt degeneration. Endothelial cells tended to congregate at the periphery and the only blood cells which survived for more than a few days were eosinophiles. The nerve cells underwent rapid disintegration. From tissue culture fixed and sectioned at intervals it was possible to follow the growth of the micro-organisms and to note their increase in numbers in endothelial cells in the vessel walls. The effect of the micro-organisms on the cells themselves appeared to be deleterious; it is evident

[1] Bulletin de la Société de Thérapeutique, March 12th, 1924.

[1] Journal Med. Res., December, 1923, vol. xliv., No. 2, 231–256.
[2] Journal Amer. Med. Assoc., 1912, lviii., 693.

that the cells containing them rapidly die, and the life of the organisms in turn is dependent upon that of the endothelial cells. In the case of Rocky Mountain spotted fever occasional filamentous forms of *Dermacentroxenus rickettsi* were observed. In the case of typhus the cells containing *Rickettsia prowazeki* congregate at the periphery of the tissue. The forms most frequently found are exact replicas of those encountered in lice fed upon typhus patients.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

THE Charter of Incorporation granted to the London School of Hygiene and Tropical Medicine, as mentioned in our news columns last week, carries into effect the stipulation of the International Health Board of the Rockefeller Foundation of New York, made in offering to provide and equip a School of Hygiene in London, by associating the proposed school with the University of London. The Charter lays down generally the constitution of the new body and appoints a provisional board of management who are to take steps for the erection and equipment of such a school, pending the appointment of a permanent governing body, and to form a first board of management for a period of not more than 18 months. The appointment of a fresh board of nine members after that period is provided for, and there is to be in addition a court of governors consisting of 35 members. Provision is made for the amalgamation of the existing school (the London School of Tropical Medicine) with the newly incorporated school, which will take over the work and functions of the existing school together with its equipment, laboratory, library, and museum, devoting to the purposes of tropical medicine a sum not less than the income of endowments for that purpose of the existing school at the date of transfer. The Charter further provides for the taking over of the staff of the existing school by the London School of Hygiene and Tropical Medicine, and for that body contributing to the cost of reconditioning the premises in Endsleigh Gardens of the Seamen's Hospital Society, if those premises are vacated by the existing school by reason of the amalgamation. As long as the Seamen's Hospital Society maintains a hospital for tropical diseases at Endsleigh Gardens, the London School of Hygiene and Tropical Medicine, so far as may be practicable and to such an extent as may be agreed upon, is to make use of the hospital for the clinical instruction of students of tropical medicine.

TREATMENT OF SYMPTOMATIC SCIATICA.

IT has long been recognised that one of the causes of sciatica may be arthritis or periarthritic trouble about the hip-joint. Indeed, some writers have gone so far as to attribute to this cause a majority at least of the cases of sciatic pain. In a paper on the Orthopædic Treatment of Symptomatic Sciatica, published in the *Journal of the American Medical Association* of March 22nd, Dr. Philip Lewin, of Chicago, attributes the symptoms of most of his cases to lumbo-sacral or sacro-iliac disease, and describes a method of treatment which is essentially the same in principle as that generally used for disease of the hip-joint. It involves extension by weight and pulley and physiological rest in bed, followed by ambulatory treatment, in which a plaster spica and a high boot on the sound foot and crutches are used, and finally, after cure a special thigh and loin corset is to be worn. Dr. Lewin has treated thus about 50 cases, most of which were cases of lumbar or lumbo-sacro-iliac osteo-arthritis. The results, he says, have been very satisfactory. Of late years much attention has been given in the United States to the diagnosis and treatment of sacro-iliac disease; many more cases have been reported in that country than in Great Britain, where definite arthritis of the joint from whatever cause arising is comparatively rare. The climate of the Eastern and Middle States of the Union is more extreme than that of our islands, and the seasonal alternation of severe cold with considerable heat may possibly be answerable for the amount of arthritic disease noticeable there. Many of the cases of sacro-iliac disease which have been described in American publications have been of slight severity, yet sufficiently disabling to drive sufferers to seek surgical relief, and it is these patients who are liable to suffer the machinations and thaumaturgical performances of quacks. The evidence of underlying arthritis may easily be overlooked, and we would call the attention of British surgeons to Dr. Lewin's paper as well as to others on similar affections of the spine and pelvis.

LUNACY LAW: THE HARNETT CASE APPEAL.

THE arguments in this case, which is again adjourned, have been reported at considerable length in the daily press, and no comment upon the proceedings, which would be permissible, would supply readers with any information which they have not before them. The discussions point to a judgment which will define for such cases in the future what measure of protection is extended by the existing law to those who sign certificates of lunacy, and if that measure is seen to be too scanty, we may assume that amendment of the law will follow. A comprehensive volume[1] on the law relating to lunacy appears at this opportune moment. The book is the result of the author's 15 years' experience as Master in Lunacy. Sir Henry Theobald deals in order with the royal prerogative in relation to lunatics, administrative control by various authorities, the functions of Judge and Master in Lunacy, of the Chancery Visitors, of the Board of Control, and of Poor-law authorities. The many points of contact of the lunatic with the general law are also dealt with at some length. While willing to forgo the word "lunacy" in legal proceedings and documents intended to be brought to the notice of patients, the author desires to retain the word "asylum" as concise, of pleasant sound, and with ancient association. The author's blindness has left without a cloud the mental vision which makes this tome a real compendium of knowledge on lunacy law.

Sir Humphry Rolleston has been re-elected President of the Royal College of Physicians for the ensuing year.

WE regret to announce the death on April 13th of Dr. Hugh Walsham, consulting radiologist to St. Bartholomew's Hospital, London.

THE memorial to the late Prof. Sir G. Sims Woodhead at the Cambridgeshire Tuberculosis Colony, Papworth Hall, which has taken the form of a new pathological laboratory and X ray department, will be opened on Thursday, May 8th, by the Hon. Sir Arthur Stanley. The hospital, hostels, workshops, and village settlement will be open to visitors from 2 to 4 30 P.M.

AT the Royal Society of Medicine hospitality will be extended to a new movement of a modest character—which is not to say that it may not develop. A small show of artistic work by medical men will be on exhibition in the Marcus Beck Room of the Society from May 26th to June 14th, and will be open to Fellows and Members of the Society and their guests and friends. The President of the Society is promoting the exhibition, Dr. Cuthbert Lockyer acting as hon. secretary, while Mr. Sydney Kendrick has kindly consented to select the work and supervise the hanging of the pictures.

[1] The Law Relating to Lunacy. By Sir H. C. Theobald, K.C. London: Stevens and Sons, Ltd. 1924. Pp. 854. £2 10s.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

LXVII.—THE TREATMENT OF SPRAINS.

ALMOST every structure in the body is subject to strain which, if repeated, or if of undue severity, is liable to produce pathological change. In this article, the effect of undue strain will be considered mainly in so far as it affects the extremities. Here the structures concerned are joints and muscles.

Joint Injuries.

Locking.—The simplest form of sprain of a joint consists of a plain locking following on prolonged muscular effort, or sudden twist or jar. There is no actual displacement, but movement is rendered painful, and the extreme range is probably limited. If the part affected is, for instance, the wrist, a sudden shake undoes the locking, the pain vanishes, and a transient discomfort alone is noticed. In severer injuries the unlocking is less easily performed, and pain and disability may persist in varying degree. This condition when occurring in the knee furnishes a typical example of cases which yield such brilliant result from so-called "bone-setting manipulation." Locking of the sacro-iliac joint (traumatic lumbago) is far more common than is supposed, and is very disabling. The pain can be relieved by manipulation followed by supporting the joint with a belt. A detailed account of the manipulations suitable to reduce the locking of the various joints will be found in an article entitled Bone-Setting (THE LANCET, 1920, i., 301).

Synovitis.—If the force to which the sprain is due is of sufficient severity to damage any of the structures which compose the joint, synovitis will usually follow, and probably ligamentous structures will be injured. The joint need not be immobilised because synovitis is present. Indeed, recovery will probably be far more rapid without unrelaxed fixation. But a sharp distinction must be drawn between the prescription of movement and of function. For instance, in the ordinary traumatic synovitis of the knee, a systematic dose of exercise of the muscles controlling the joint, and of movement of the knee will hasten absorption; but if the weight-bearing function of the knee is added to the movement, recovery will be delayed. The ideal treatment for this condition is to apply wool in large quantities round the joint (a half-pound roll of cotton-wool, fluffed out before the fire is not too much), over which mass a bandage is very firmly applied. If pressure is applied over an insufficient quantity of wool, circulation is impeded.

The idea of the application is to exert sufficient pressure on the joint to check further effusion, and, while not preventing movement, to limit it. Frequent muscle contraction, and movement so far as the pressure will allow, are then practised freely; but weight-bearing should not be allowed until the fluid is absorbed. Graduated faradic contraction is useful while effective voluntary contraction is impossible, but should not be allowed to replace it.

Torn Ligaments.

If on examination after a sprain some point of special tenderness can be discovered at a point not directly over the joint line, it is probable that some ligament has been torn. Even then there is no need for absolute fixation unless the tear is severe enough to allow displacement of the joint, but it is all the more important to prohibit function as distinct from movement. Except at the extremes of anatomical movement in a joint, no strain is laid upon the ligaments during movement. Thus a limited movement will allow repair of the torn ligament to take place while hastening the absorption of fluid and maintaining the circulation in the muscle.

Immediately after injury, pressure should be exerted over the sensitive spot by the pad and bandage already described, and, in addition, a thick pad of some non-resilient material, such as felt, should be applied over the sensitive spot, the pad being covered with adhesive plaster with the adhesive side outermost to prevent slipping. When swelling has disappeared and function is prescribed, it is well at first to support the injured structure. For example, a wedge should be placed on the inner side of the heel if the internal lateral ligament of the knee has been torn, or a corresponding wedge on the outer side if the external lateral ligament of the ankle has been injured. It is wise to limit movement by strapping; as recovery takes place full anatomical range should be allowed once a day, with the strapping removed.

The rest position of injured joints must be studied so that the action of gravity so far as is possible is obliterated. Thus in the treatment of a sprain of the acromio-clavicular joint, the weight of the arm in the upright position must be borne by supporting the olecranon firmly upon a sling, and movement must be practised only in the recumbent position. Similarly, the wrist should be treated on a short, cock-up splint between the intervals allowed for prescribed movement; this should be performed with the patient recumbent and the forearm vertical, the hand being deviated towards the side of the injured structure. The fingers should be treated during the period of rest in the flexed position. During the periods of rest the knee should be slightly flexed, and the patient encouraged to lie so that the external ligament is kept under tension if the internal lateral ligament is involved, and vice versa. The ankle should be supported at a right angle, slightly inverted or everted, according as the internal or the external ligament is damaged. A severe sprain of the shoulder may lead to disastrous results, and if abduction cannot speedily be regained in the recumbent position, the use of an abduction splint should be advocated in the acute stage. When this can be discarded the olecranon should be supported. The movement prescribed should only be performed in the recumbent position, with the weight of the arm supported on the floor or table. A severe sprain of the elbow should always be treated on conservative lines; for, although X rays may show no injury to bone, a comparatively trivial injury may often result in a massive formation of new bone if an attempt is made to hasten recovery unduly, and this may seriously impede restoration of function. The limb should be supported in the flexed position in a sling, with the extended thumb resting upon one side of the neck and the fingers on the other. When swelling has disappeared epicondyle restoration of movement may be regulated by placing a "collar" round the neck and a "cuff" round the wrist; the two are strapped together by a tape, the length of which is increased day by day. If it is found one day that the original position of flexion cannot be secured voluntarily, the flexed position should be gradually restored and the limb rested in this position for a few days, when the attempt may be renewed.

Dosage of Movement: Massage.

Increase of pain or swelling, or decrease in mobility means that too much freedom has been allowed. While pain and swelling are decreasing, and painless movement is increasing, it is safe to advance. Pain on movement means irritation of the joint, or undue strain upon a damaged ligament.

Massage.—If the injury has been severe there will almost certainly be a painful reflex protective spasm of the muscles controlling the movement of the joint. Massage skilfully applied is the correct remedy and should begin well away from the affected area. It may even be advisable to start with massage of the thigh when the ankle has been injured. As relief is experienced the injured part may be gradually approached. Only stroking and gentle kneading movements should be employed, becoming more delicate as the sensitive area is approached. The aim of the massage is to relieve muscle spasm, and so to render painless voluntary contraction possible. The use of the pad and bandage, and of strapping, is a means of exerting a sort of auto-massage of the

injured part every time that movement takes place. A layer of stockinet between the strapping and the skin is of advantage, especially in those with sensitive skins. The strapping must be laid over the surface of the skin so as to exert no pressure, the object being: (1) to form an inextensible skin; (2) to limit movement.

Passive Movement.—If the injury has been very severe, passive movement may prepare the way for active movement. Passive movement, however, can be performed only after complete muscular relaxation has been secured by massage, and must be absolutely painless, or reflex contraction of the antagonists will occur and complete relaxation is no longer present. Any movement which is then performed is a forced, and not a passive, movement, and will do far more harm than good. The same applies if the movement lays any strain on a torn ligament. Provided the patient's sensory tracts are not diseased, no movement which does not elicit pain can do harm.

Torn Muscles.

If a muscle is torn as the result of a sprain, it is important to prevent adhesions from forming between the injured fibres. Treatment should begin with massage to allay spasm, and the pad and bandage or strapping is then applied according to the severity of the injury. If voluntary movement is inhibited by pain in spite of massage, faradic stimulation should be applied until voluntary action is fully restored.

Chronic Sprains.

A tendency to repeated strain means either that the supporting ligaments of the joint have been permanently stretched as a result of previous injury, in which event nothing but adequate support will prevent recurrence; or that some or all of the muscles which control the stability of the joint have lost power, and then perfect recovery will follow the building up of the muscle strength. If persistent pain is a sequel to the sprain of joints or muscles, and certain movements provoke pain, adhesions are usually present, and must either be stretched or broken down. If a muscle only is involved, stretching will sometimes follow faradic contraction or suitable exercises. If a joint is involved, occasionally restoration can be accomplished by means of massage, manipulation, and exercises; but, as a rule, manipulation under an anæsthetic is required for complete cure. This means that some abnormal structure must be torn across—that is, the re-infliction of an injury—which must be treated as a recent sprain of the part. In cases of sacro-iliac or lumbo-sacral strain these two remedies are insufficient and support is called for. In tennis elbow constant trauma may have caused a small bursa to form underneath the origin of the muscle. The bursa can sometimes be cured by inserting a needle into it and passing a galvanic current of 5 to 6 milliampères for five minutes through the needle. If this fails the patient must put up with the disability or have the bursa removed by operation. A chronic strain of the shoulder (as found in pitchers at baseball, and in lawn-tennis players) will often defy treatment, and effectively prevent further participation in the game. The trouble is probably due to a recurring sub-deltoid bursitis, and the only remedy (short of excising the bursa) is for the patient to practise abduction in the recumbent position at frequent intervals during the day, always stopping short within the limit of pain. Ionisation or diathermy relieve pain and may hasten recovery. In other cases operation may afford the only chance of relief.

A Warning.

When considering a severe strain, if there is any possibility that bony injury may have taken place, an X ray should be taken to exclude fracture. In the later stages, before forcible manipulation is undertaken, it is always wise to have the joint X rayed again, since if traumatic osteo-arthritis is advancing, it is often wiser to avoid all forcible movement.

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Special Articles.

THE TUBERCULOSIS SOCIETY: MEETING AT CAMBRIDGE.

A MEETING of this Society was held in Cambridge on April 10th, 11th, and 12th, with Dr. E. Ward, the President, in the chair.

A Comparison of Tuberculosis in Man and Animals.

Dr. Louis Cobbett, in his paper on this subject, pointed out that not only the distribution, but the very appearance of tuberculosis varies greatly in different animals, and that in the rat, for example, tubercles look more like sarcoma or lymphadenoma than the familiar tubercles of man. The rat is the least sensitive of all animals to tuberculosis, tolerating enormous doses of tubercle bacilli. But there are limits even to the rat's resistance, and an intraperitoneal injection of 50 mg. of tubercle bacilli ultimately proves fatal. Though there may hardly be any macroscopic lesions demonstrable in such a rat, a smear from any of its organs shows enormous quantities of bacilli. Dr. Cobbett demonstrated numerous photographs and slides showing how in the lung of the ox, for example, tags or villi develop on the surface, which assumes a shaggy appearance like that of a rough towel. On the liver, however, these superficial tags become flattened and mushroom-like. A point he emphasised was the difference in the susceptibility of the various organs in the animals subject to tuberculosis. In the rabbit, for example, the lungs and kidneys seem to be most susceptible, whereas in the guinea-pig the liver and spleen come first in this matter, the kidneys proving to be remarkably resistant.

Developing the theory that it is the highly specialised and hard-worked organ which is most subject to tuberculosis, Dr. Cobbett gave an account of tuberculosis in the mammary glands of different animals. In the cow the mammary gland has become highly specialised and hard-worked because for thousands of years she has been bred by man for her milk-producing qualities. These qualities have now reached a pitch when the cow produces more and richer milk than her own progeny can digest, and Dr. Cobbett gave an amusing account of a controversy between himself and an attendant employed by the Royal Commission on Tuberculosis to feed the experimental animals. Against the advice of this attendant Dr. Cobbett gave the calves the run of their mother's milk, with the result that the calves died, their intestines being found stuffed with undigested curds. The cow has had to pay the penalty for this specialisation of her mammary glands with reduced resistance to tuberculosis in them: about 2½ per cent. of all cows suffer from tuberculosis of the udders, whereas mammary tuberculosis in the human race is exceedingly rare. Similar differences, depending on similar reasons, may be observed in the rabbit and guinea-pig. The rabbit breeds many young in one litter, and they are long dependent on their mother's milk. Hence the comparative susceptibility of the rabbit's udders to tuberculosis. The guinea-pig's udders are practically never tuberculous, and in this connexion it is noteworthy that the young guinea-pig depends on its mother for its food for only a brief interval. For the same reason the hard-worked, highly specialised brain of man is more subject to tuberculosis than the brain of the lower animals, and the comparative frequency of tuberculosis in the heart of the dog may be associated with the sudden and violent calls made on this organ by the dog. Other factors determining the occurrence of tuberculosis in various organs are their degree of exposure to infection and their capacity to retain tubercle bacilli or pass them on. With regard to the first of these points, the lymphatic glands are frequently tuberculous because they bear the brunt of the first attack; it is no discredit to them that they are tuberculous any more than it is a

discredit to the police force that many of their members have broken heads. As for the second point, muscle tissue is remarkably free from tuberculosis, largely because it does not arrest tubercle bacilli which pass on. Dr. Cobbett referred to some interesting experiments on chemical affinities in connexion with the localisation of tuberculosis, and he pointed out how, when carmine is injected, it may adhere to the endothelium of some organs but not to that of others. Similarly the particles of fat in the tubercle bacillus may attract it to certain organs with a craving for the same fats. With regard to the problem of the conversion of one type to another, he thought that this process must be practically impossible for the definitely human and bovine types, and he emphasised the difficulties of experimental work in this field.

In the discussion which followed Dr. H. A. Ellis suggested that the problem of tuberculosis was largely one of acidity and alkalinity, the tubercle bacillus pining in an acid medium and when its host was fed on meat. He was convinced that all successful treatments are essentially acid treatments, being acid by virtue of increased metabolism. He referred to observations on tuberculosis on monkeys at the Zoo and the beneficial effects noted in the case of a tuberculous monkey fed on meat.

Experiences with Diaplyte Vaccines.

Dr. E. Ward read a paper on this subject, prefacing it with a review of the researches which led up to the evolution of the diaplyte vaccine. In addition to observing over 60 cases treated with this vaccine in London, he had given it to 41 of his own patients, most of whom were in the third stage of pulmonary tuberculosis and were "hang-fire" cases. There were only one or two cases in the first stage of the disease. He had also tried this vaccine in a few cases of lupus and tuberculous sinuses. After detailing his dosage he reviewed the general effects. The temperature reaction was very varied; there might be no change, or the temperature might be lowered or raised, or it might be first lowered and then raised. In some cases there was an immediate rise of temperature, and in others there was no change in the temperature, but an increased pulse-rate showed that the vaccine was doing harm. He had also seen the vaccine have a cumulative effect, the delay in the ill-effects of the vaccine not saving the patient from a very serious reaction. In several cases there was a considerable interval between the injection and the focal reaction, in the judging of which Dr. Ward insisted that the ear is more likely to be deceived than the eye. Headache, anorexia, general malaise, pain, pleurisy, hæmoptysis, and attacks of phlyctenules recurring regularly after each injection were but some of the ill-effects recorded, and many of his cases had terminated fatally. He had come to the conclusion that his observations on man were confirmatory of those of Dr. E. H. Kettle [1] on the guinea-pig, but he adumbrated the possibility of obtaining better results by modifying the technique—i.e., changing the dosage and the spacing with a view to eliminating the injurious effects of the focal reaction. He referred in appreciative terms to the stimulating effect which Dreyer's work has had on this subject, and he hoped that further knowledge of the spacing of doses of tuberculin would help to solve the problem of graduated exercise. At present the cumulative effects of frequent injections of tuberculin and graduated exercise, continued daily, struck him as injurious.

Dr. F. E. Gunter compared the action of the older tuberculins with that of diaplyte vaccine, and he discussed the relation of a high blood pressure and fatness to specific treatment. In some cases he had found a change from tuberculin to diaplyte vaccine do good. Asthmatics, he had found, derive great benefit from tuberculin, to which thin patients react less satisfactorily than fat patients. Mr. G. R. Girdlestone referred briefly to his experiences with diaplyte vaccine in surgical tuberculosis, and, like Dr. Ward, he stressed the desirability of ringing the changes on the dosage and spacing in the hope that better results may be obtained. Though he had seen no focal or general reactions, he could not, on the other hand, positively affirm that the diaplyte vaccine had done good. Dr. H. G. Trayer had treated 60 cases, nearly all pulmonary, with diaplyte vaccine. Of 25 sputum-positive women patients, 14 were improved, 4 were as before, 2 were definitely worse, and 5 were dead. Of his 35 male patients, 33 were sputum-positive. There were only 9 improved and 7 were as before. Five were worse and 14 were dead.

More than one speaker congratulated Dr. Ward on the fairness and impartiality of his paper.

[1] THE LANCET, Jan. 12th, 1924, p. 68.

Tuberculosis Work in America.

On Friday, April 11th, Dr. R. C. Matson, of the National Tuberculosis Association of America, gave an account of American tuberculosis work in general and of the activities of his Association in particular. Many of the speakers who followed him gave their own views and experiences of tuberculosis work in America, and he, in winding up the debate, had some interesting comments to make on what he had seen of tuberculosis work in England. He said that the Christmas sale of tuberculosis seals or stamps in America was first started in 1908 in coöperation with the American Red Cross, only 5 per cent. of the proceeds being devoted to the expenses of the central organisation. The rest of the money was spent in the localities in which it was raised. It was calculated by his Association that there ought to be a bed for every annual death from tuberculosis, but at present the ratio of beds to annual deaths in the U.S.A. was only 70,000 to 100,000. It had been calculated that there were nine active cases and nine latent cases for every annual death. There were about 700 sanatoriums, 595 dispensaries, and 11,000 tuberculosis nurses. There had been a reduction of the tuberculosis death-rate from 202 per 1000 in 1910, to 94·2 in 1922. Pirquet and intracutaneous tests carried out by Dr. C. H. Smith on 3500 children at the Bellevue Hospital Clinic had shown that only 40 per cent. of the 15-year-old children were tuberculin-positive. Similar findings in St. Louis and Philadelphia were in marked contrast to the 75 per cent. positive findings of various centres in Europe less than a generation ago, and it is evident that the morbidity as well as the mortality is coming down with a run in the U.S.A. Dr. Matson gave an account of the almost innumerable activities of his Association and the way in which every aspect of the problem is being scientifically and systematically tackled.

Answering various questions and criticisms, he referred in particular to European misconceptions as to the spitting habits of the average American. Whatever these may have been a generation ago, it was certainly no longer easy to spit in public, even out of doors. To do so in a tram was to ask for trouble. He did not believe that any connexion had been demonstrated between smoke abatement in the towns and the decline of tuberculosis. As for the differences in the tuberculosis rates among the various races in the U.S.A., he suggested that these differences were not merely racial but economic; these rates were high among Jews, Irishmen, and Norwegians living in poor areas, while they were comparatively low in richer areas inhabited by the same races. As for sanatorium construction, the present tendency is to prefer large, solidly constructed buildings to small extemporised sanatoriums, the efficiency and administrative cost of which leave much to be desired. He criticised the system, adopted in parts of England, of not trusting the patient; in the U.S.A. the patient is taught as much about his disease as possible, to take his own temperature, and more or less to become his own physician. In this connexion he described the steps taken to educate the public by articles in such periodicals as the *Journal of Outdoor Life*, which devotes its columns to the exposure of fake consump-

tion cures, and to instilling the principles of hygiene. Other matters referred to were the decline of tuberculosis due to bovine infection in New York, this decline being associated with the pasteurisation of milk. Other problems touched on were those of tuberculosis in the negro, after-care, the indigent and migratory consumptive, and the effect of climate and altitude on the incidence of tuberculosis. In this last matter it is significant that as much as 30 per cent. of all the deaths from tuberculosis in Colorado occur among the natives.

Dr. S. Roodhouse Gloyne anticipated that popular health literature, as exemplified by the American *Journal of Outdoor Life*, would not appeal to the Englishman sufficiently to give the publisher a return for his money, and he argued that the psychology of the British and American not being identical, it would be unwise to assume that what was sauce for one would be so for the other. But both he and Dr. E. Ward, who spoke on the same subject, recognised the value of popular education by the printed word. Dr. Gloyne's references to the differences between the two countries in the matter of provision for research were an oblique tribute to the public-spirited attitude of the Americans. Dr. Matson promised to give information at the Wembley Exhibition about the Framingham demonstration.

(To be continued.)

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

The Bacterial Flora of Paper Money.

PAPER money has been till recently the only currency in the hands of the public. A bacteriological investigation of paper money carried out by Dr. Kiefer, and published in the *Archiv für Hygiene*, is therefore of great practical interest. He explains that minted coin is not only from a financial point of view but also for bacteriological reasons preferable to paper money. Coined money is innocuous owing to the self-disinfecting action of the metal itself and because its small and smooth surface prevents the development of germs. The dirtiest piece of copper is from the standpoint of a bacteriologist better than newly-issued paper money. In post-war bank-notes which had been for some time in circulation 13,000 to 143,000 germs were found, whilst in pre-war bank-notes it had previously been proved that only 800 to 3000 germs were present. The reason is that previously to the war those notes were only little used and did not pass from hand to hand as at present. The number and the kind of germs was not influenced by the wear and tear of the notes, nor did the habitat of the notes matter whether they came from a butcher, a baker, or a candlestick maker. Notes which had been handled with wet fingers—e.g., in fishmongers' shops—were richer in germs, as in general dryness of the paper hinders bacterial growth. It makes a great difference, however, whether the bank-note consists of soft or of laid paper, the latter offering more opportunities for the germs to stick to the paper. The author has made investigation into the vitality of the germs and found that streptococci were virulent 54 hours, whilst enteric fever bacilli lived 11–96 days, *Bacillus dysenteriæ* (Shiga) 17–52 days, and *Staphylococcus pyogenes aureus* 93–127 days. Various infectious diseases may thus be spread by paper money more frequently than by any other article in use among the people.

Transfer of Medical Practices.

Compared with the state of things in England the transfer of practices for money is rather rare in this country and no professional agents exist who negotiate such transfers. The reason is that the German law does not sufficiently protect the purchaser of a practice against breaches of the contract by the vendor. In the official journal of the Leipziger Verband a very remarkable case of that kind was lately published where a doctor had purchased the practice and also hired a part of the house of another medical man under the condition that the vendor should abstain from practising in the respective town and its surroundings. Notwithstanding the clear provision of the contract, the vendor four weeks later began to practise again in the part of the house where he had continued to live. The purchaser then applied for an injunction at the local law court that the vendor be ordered to abstain from so doing under penalty of a large fine. The judge, however, declined to give the injunction, declaring that the provision by which the vendor had to abstain from practising was invalid. He summoned both parties before the court, and to avoid the high expenses and the long duration of a law-suit they came to an agreement of which the most important provisions were that the purchaser had to leave the house as soon as a new residence had been provided for him by the authority dealing with the distribution of dwellings (Wohnungs-Amt), that the vendor might take up practice again, but that he had to pay to the purchaser 25 per cent. of his income from club practice. The legal adviser of the Leipziger Verband, who was asked for his opinion in the case, has made the following statement: The decision of the judge was quite in accordance with numerous decisions of the High Court of Justice. That court has decided that a provision of a contract preventing a medical man from practising must be regarded as immoral and thus null and void. It is in the public interest that a doctor should carry out his medical practice and that consideration must always have priority to the private interest of a purchaser; when a vendor begins to practise again he is, of course, liable to repay the sum or part of it to the purchaser. Although the vendor cannot therefore be prosecuted in a civil law court for such breach of the contract, he is nevertheless responsible for his action to the medical court of honour, because by agreeing to a provision under the mental reservation to break his promise he has acted against the most elementary principles of medical ethics.

The Danger of Malaria Treatment in G.P.I.

The Minister of Public Health drew the attention of the medical profession to the fact that the treatment of general paralysis of the insane by injections of malaria germs—a method devised some years ago by Vienna alienists—may have the drawback that malaria, which for many years has been non-existent in Germany, may again be spread and become endemic. This is the more so because the anopheles by which malaria is conveyed is found nearly everywhere in this country. Medical men who administer the malaria treatment must therefore carefully protect the patients against the bite of the anopheles mosquito. The district medical officers of health are instructed to register every case of malaria and to investigate its origin and its possible connexion with the treatment of G.P.I.

Economy in Prescription Writing.

The sick-clubs had complained that they had great financial difficulties in bearing the enormous cost of medicines and drugs prescribed by the profession. At a recent meeting of the German Board of Public Health, a consultative body connected with the German Health Office, the matter was discussed at the request of the above office. Four members—namely, Prof. Kraus, of Berlin, and Prof. Müller, of Munich, as physicians, Prof. Jadassohn, of Breslau, as dermatologist, and Prof. Straub, of Munich, as pharmacologist, read papers on the subject. As a result the Board expressed the following opinion: that under the present bad condition of German finances in general, and of the legally instituted sick-clubs in particular, it was the duty of the medical profession to restrict the prescribing of medicines and of dietetic compounds as much as possible. Amongst compounds of equal efficacy they should choose always the least expensive, the prescription should

be made in a plain form, and complicated combinations avoided. Compounds which are legally allowed to be sold without a written prescription should be given preference over others. Patent medicines ought to be avoided as much as possible and German drugs be preferred to foreign ones, because they are, as a rule, cheaper, being exempt from duties. It must, however, always be considered that an expensive drug, if more efficacious than a cheaper one, is preferable to the latter, because it shortens the time of the illness and thus makes the patient sooner able to work. Modern medicines ought to be prescribed only when their value has already been proved by competent physicians, by systematic research in hospitals and university clinics.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

AMONG the earliest annual health reports for 1923 to reach us are those of three boroughs, some of the principal statistics of which are given in the following table:—

Name of borough.	Estimated mid-year population (R.-G.).	Birth-rate.	Death-rates per 1000 of the population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory with influenza.	Neonatal mortality.	Infant mortality.	Maternal mort. from childbirth.
Bootle (C.B.) ..	81,580	24·5	13·1	1·7	0·9	3·1	35	85	2·0
Hornsey (B.) ..	88,325	13·8	10·5	0·7	1·6	1·9	31	52	4·0
Poole (B.) . ..	43,860	19·3	11·9	1·4	1·6	1·1	31	60	2·4

Bootle.

Dr. F. T. H. Wood states that housing remains the most pressing of the public health needs of the borough. No houses were completed by the council during 1923, but it is proposed to build 100 during 1924. It is estimated that 988 houses are required to bring the housing of the Bootle population up to the 1911 standard for the whole population of England and Wales. A tabular statement shows a marked excess of tuberculosis in Bootle since 1913, and that the rate since the war has been higher than in 1913-14. A wireless installation has been provided out of voluntary funds for the entertainment of the patients at the Linacre tuberculosis hospital. In the case of non-pulmonary tuberculosis the council maintain six beds at the Leasowe hospital for children, and also pay to the general hospitals for the treatment of adults. Venereal diseases, judged by the new cases applying at the clinic, have shown a steady decline since 1919. The total expenditure on these diseases for 1923-24 was £2135, and the council have joined with the Merseyside boroughs in a representation to the Ministry advocating that it be made a statutory obligation on sufferers to obtain treatment. It has been found necessary to increase the expenditure on free (dried) milk for mothers and infants from £250 to £300. The antenatal work grows, and during the year about one in six of the expectant mothers attended the consultations. Cases of threatened eclampsia, contracted pelvis, and syphilis were thus brought under timely treatment. The number of cases admitted to the maternity home was 109—39 for obstetric reasons and the remainder on account of unsatisfactory home accommodation. The cost of the maternity home for the year was about £1500, one-third of which was paid by the patients, the remainder being charged to the rates and Exchequer grant.

Dr. Wood points out that Bootle has the highest birth-rate of the 17 Lancashire county boroughs, but that, in spite of this fact, only three of them—viz., Southport, Blackpool, and Warrington—showed a lower infantile mortality-rate. One case of ophthalmia, which was not notified, was followed by blindness. An additional health visitor was appointed in April, and it was found possible to pay more than four visits to each baby, two visits to each child in its second year and one visit to each child between the ages of 2 and 5. The sessions at the infant welfare centres have had to be increased, and the Bootle Health Society has continued its valuable services in supplying voluntary workers, supplementing the milk assistance scheme, &c. Dr. Wood discusses the question of public health education. He attaches importance in the first place to the activities of health visitors and school nurses, and in the second place to the teaching of personal hygiene to the young during and shortly after school life, but propaganda work directed to the public in mass must not be neglected, and in pursuance of this latter aim addresses have been delivered during the year to various existing organisations at their periodical social or business meetings. The possibilities of the kinema and of broadcasting are also urged.

Hornsey.

Dr. A. T. Nankivell, in presenting his report, insists, like Dr. Wood, on the importance of public health education if we are to make further progress. Hornsey is, notably, not a self-contained town. The Census figures show that 27,534 persons leave Hornsey daily for their work, while, on the other hand, 5515 workers enter Hornsey daily. Such a daily movement of the population, Dr. Nankivell points out, often in crowded conveyances, gives great opportunities for the contraction of respiratory infections. During 1922 a mixed vaccine, designed to protect against colds, bronchitis, and pneumonia, was distributed for trial to 60 doctors in Hornsey, free of cost. Of the 60, only 21 replied to Dr. Nankivell's inquiry as to their experience of the vaccine, but of these 21 only one thought the vaccine was no use. Many of the replies are quoted and are so favourable that the experiment has been repeated this winter.

The report includes an interesting chart showing the death-rate, infant mortality, and neonatal mortality rates from 1883 to 1923. The chart shows that up to 1900 the infant mortality-rate remained unaffected by the decline in the general death-rate; that since 1900 the infant mortality has come down from the neighbourhood of 120 to the neighbourhood of 60, while the general death-rate has increased from about eight to 10 or 11; and that throughout this period of 40 years the neonatal mortality has remained practically the same with even a slight tendency to increase during the years since the war. In commenting on this last-named feature, Dr. Nankivell stresses the need for an extension of antenatal work, but also refers to the taking of drugs to bring on abortion as "a common and wide-spread practice," and a cause of infant death "well known to midwives, health visitors and doctors who are acquainted with maternity work." There are no areas in Hornsey which could be called slums, but here and there groups of dilapidated houses, sublet to several families, which need close supervision. For economic reasons the families living in these sublet houses will not be able to rent the houses which the council is preparing to build, and those who are thriftless and bad tenants would not be received into a corporation house. Dr. Nankivell mentions among the needs of Hornsey—a convalescent home, a residential open-air school, and the establishment of open-air classes.

An inquiry was made as to the prevalence of left-handedness among the school children, arising from the report of some of the head-teachers that this condition was prejudicial to the child in after-life. Among 6058 children examined, 239 were found to be left-handed and 87 ambidextrous. Of the 239 left-handed children, six had a stutter, 42 were dull and backward, 181 were of normal intelligence, and 16 more than usually bright. Of the 87 ambidextrous

children, 15 were dull and backward, 69 of ordinary intelligence, and three above the normal in mentality.

Poole.

Dr. R. J. Maule Horne draws special attention to the extension of the water undertaking so as to give an ample reserve and to the sewering of two difficult areas which will enable many cesspools to be abolished. An estimate was made that in 1921 there was a shortage of 824 houses as compared with the 1911 standard. Since 1921 874 houses have been built or arranged for, and it is estimated that a further 250 houses are needed to provide for the natural increase of the population. Attention has been given to mosquito-prevention by spraying the likely breeding places with paraffin. The Poole milk does not come out well, when judged by a permissible standard of 20 parts of solid sediment per million parts of milk, as 19 samples out of 34 failed to pass this test. The analyst reports that eight out of 10 samples of butter contained an excess of water, and that a sample of lard (which ought to be free from water) contained 4·5 per cent. of water. He estimates that if all lard were similarly adulterated the population of the town would lose 2·8 tons of fat food in a year! The school report shows that the average school attendance has steadily increased from 86·1 per cent. in 1919 to 91 per cent. in 1923. Of 1199 children referred to the dental clinic, 966 (80·5 per cent.) actually attended and received treatment. Charges for treatment at the school clinic were only introduced during the year, so it is too early to speak as to the effect of the innovation.

Cardiff Port Sanitary Authority.

Dr. Ralph M. F. Picken reports that the prevalence of small-pox in Portuguese ports necessitated more than usual vigilance. The amount of shipping dealt with showed an increase over the past two years and the foreign tonnage has only been once (1916) exceeded since 1914. Twenty-eight nationalities were represented. Methods of inspection have to be very prompt, as vessels come in large numbers into five docks on the tide and go rapidly under the tips with a view to early departure. The work of the V.D. clinic at the Royal Hamadryad Seamen's Hospital has proved very valuable. The number of seamen attending for the first time, which reached its maximum (1234) in 1920, was 821 in 1923. The examination of 156 rats, caught on vessels or in warehouses, for evidence of plague, gave negative results. The number of rats destroyed during the year was less, but the campaign against them has not slackened, and Dr. Picken thinks the decrease may be attributed fairly to the increasingly efficient methods of rat destruction adopted at all ports throughout the world. *Xenopsylla cheopis*, the plague flea, was found in nine out of 21 rats from the Cardiff docks. The rats caught in vessels and warehouses at the docks are consistently of the black variety, while those found in the city are mostly brown. There is no evidence that the rat population at the docks is being replenished from the city. The drinking water of 210 ships' tanks was examined and reported to be satisfactory in 127 cases, of moderate purity in 41, of doubtful purity in 19, and contaminated in 23.

INFECTIOUS DISEASES IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 5TH, 1924.

Notifications.—The following cases of infectious disease were notified during the week, namely: Small-pox, 99; scarlet fever, 1336; diphtheria, 649; enteric fever, 38; pneumonia, 2025; puerperal fever, 35; cerebro-spinal fever, 13; acute poliomyelitis, 3; acute polio-encephalitis, 1; encephalitis lethargica, 190; dysentery, 14; ophthalmia neonatorum, 134. No cases of cholera, plague, or typhus fever were notified. The cases of encephalitis lethargica were notified in the following counties: London, 17; Chester, 9; Lancaster, 47; Northumberland, 9; Nottingham, 8; Warwick, 26; Yorks, W. R., 34; and elsewhere in smaller number.

Deaths.—In London, the deaths from diphtheria, which had been 10, 15, and 14 in the preceding three weeks, fell to 11 last week, and those from measles, which had been 98, 121, and 100 in the preceding three weeks, fell to 62 last week. The deaths from influenza, which had been 89, 83, and 49 in the three preceding weeks, further fell to 45 last week.

Correspondence.

"Audi alteram partem."

SCHICK IMMUNISATION IN DIPHTHERIA.

To the Editor of THE LANCET.

SIR,—My attention has been drawn to a letter from the Secretary of the Anti-Vivisection Society in the *Brighton Herald* of March 22nd attacking the views of Dr. D. Forbes, M.O.H. of Brighton, from which a highly distorted inference would be drawn from the results of our experiences of the Schick methods in their application to the prevention of diphtheria amongst the staff of the Bristol Fever Hospital, as recorded by me in your issue of Oct. 6th, 1923.

Our results here have shown that, although a negative Schick reaction does not *always* mean complete clinical immunity to diphtheria, under the exceptional conditions to which fever hospital staff are exposed in nursing an unusually virulent and infective type of the disease, it certainly always indicates a comparatively high immunity. Although a few of our negative reactors contracted diphtheria, it was a very mild type of disease compared to the extremely severe attacks from which members of our staff were suffering previously to our adoption of Schick's method. In reference to artificial immunity conferred by toxin-antitoxin mixture, none of our staff who has had three doses of this mixture has contracted diphtheria since our using this method, extending over a period of 26 months. With two doses a few failures of protection were recorded.

As I consider that those in close and constant contact with this disease require a higher immunity than would suffice to protect those exposed to slight and infrequent exposure to infection in the outside world, I have been giving all joining members of our staff three doses of T.A.T. mixture before allowing them to nurse in the diphtheria wards without applying the Schick test to them. Up to the present none of these 32 new members so treated, who joined since last autumn, have contracted the disease, although daily exposed to a type of disease of high virulence. None of those inoculated during the past 26 months have evinced any serious symptoms whatever.

I am personally convinced that the general use of T.A.T. in schools would exercise a profound effect in reducing the mortality from this deadly disease, but it is wise to consider that, like everything else in medicine, those methods are not *absolutely* infallible.

I am, Sir, yours faithfully,

B. A. PETERS, M.D. Camb.,
Medical Officer, Ham Green Hospital, Bristol.

April 10th, 1924.

AURAL VERTIGO.

To the Editor of THE LANCET.

SIR,—The discussion on vertigo at the Royal Society of Medicine[1] left inevitably a sense of incompleteness, as time did not permit of any attempt to harmonise the views presented from so many different angles. As I understand it will not be resumed, I would like to touch on one or two of the points raised.

1. *Equilibrium.*—I was a little surprised that no one pointed out that perfect equilibrium is possible when the semicircular canals have been completely destroyed or rendered functionless by disease or operation, so that the afferent stimuli from them are wholly absent; vertigo does not result from the absence of those stimuli, but from their perversion; when there is a lesion of the canals of whatsoever nature, there is always a potential cause of vertigo; when their action absolutely ceases, equilibrium is restored. (I am assuming for practical purposes that equilibrium and vertigo are the converse of one another, which,

[1] THE LANCET, March 1st, p. 444.

as Mr. Fisher pointed out, is not quite true, the fact being, I think, that we use the word equilibrium to cover the physical state and the mental—i.e., the sense of equilibrium.)

Cyon showed long ago, in pigeons whose semicircular canals had been rendered completely functionless, that the Flourens phenomena did not occur. Apart from that, there are two facts as regards man which prove that equilibrium can be maintained without the aid of the semicircular canals: (1) One case certainly, and I think more, have been shown in the laryngological section in which the whole of the auditory apparatus had been extirpated on both sides, and yet perfect equilibrium was maintained. Further, the patient showed no vertigo and no nystagmus when rotated. (2) I believe that the same thing is true of all congenital deaf-mutes. I understand that they do not show vertigo with any of the ordinary tests, and they certainly are quite impervious to sea-sickness. I made inquiries at a large deaf-mute school in Brighton which I visited several times, and the master there, with 40 years experience, told me he had never known of a case.

As regards both these classes, we want to know what they lose apart from their deafness. Do they lose the sense of motion and direction in space (semicircular canals), or the sense of position in space (otoliths)? The value of the reflexes demonstrated by the Dutch investigators has to be considered carefully in this connexion. The Americans rejected from their flying corps all men who did not show the normal degree of instability when rotated, but whether this was only a general principle or was based on ascertained facts I do not know. If, as I believe, it is found that there is no serious drawback for practical purposes except deafness, we are driven to the somewhat painful conclusion that in the semicircular canals man possesses a beautiful and complex mechanism which has been superseded by higher development, and whose only positive function now is to produce some of the most disabling and distressing symptoms which the human body can experience; moreover, so bound up with the organ of hearing that it is impossible to remove it without inflicting the penalty of deafness. To further our knowledge on this point, we need, unless it has been already carried out, a systematic examination of the reactions of deaf-mutes, and of the effect on them of lesions which ordinarily cause vertigo (aural, cerebellar, &c.). Observation of the effect of an acute lesion of the fourth nerve in a deaf-mute might help to settle Mr. Fisher's doubt as to the directness of the effect of ocular lesions, and also, whether vertigo really occurs at all when the functions of the semicircular canals are abrogated, except in cerebral lesion.

2. *Aural Vertigo.*—When I read some 25 years ago the statement quoted by Sir H. Rolleston of Sir W. Gowers that nine out of ten of the cases "which seek advice for vertigo" have an aural lesion of some sort, I was rash enough to doubt it, and set to work to disprove it. After collecting something over 200 cases, I came to the conclusion that Sir W. Gowers was entirely right, and that the chances of an aural lesion being present are at least 9 to 1, though the proximate and apparent cause may be something quite different. I have to thank my friends the late Mr. Creswell Baker and Mr. A. T. Hutchison for their very kind help when there was any doubt about the ear.

It is impossible to give fully the conclusions I arrived at, much less the clinical evidence on which they are based, but I should like to state, very briefly without dogmatising, some of my own inferences.

(*a*) I believe that a patient with a permanent aural lesion, though long inactive, must be regarded as having a permanently lowered threshold for vertigo. They may never have an attack, or only at very long intervals due to some intercurrent cause which may be anything from transient dyspepsia to oncoming arteriosclerosis, but the liability is there.

(*b*) There are many causes which tend to produce slight attacks of vertigo—e.g., the climacteric, arteriosclerosis, ocular and digestive troubles; but where severe vertigo resembling the vestibular type occurs with one of these conditions, either constantly or alternating with lighter attacks, then an aural lesion is always present in addition.

(*c*) Owing to their intermittent character and the fact that the aural lesion may have been quiescent for years, the nature of aural attacks is often overlooked, unless the character of the vertigo is carefully inquired into. Like migraine, they may be concealed under the name of bilious or gastric attacks, and, rarely, may be confused with migraine where unilateral pain is present due to increased tension in a smouldering lesion.

(*d*) The causes which produce severe vertigo apart from aural trouble are quite rare; it is by no means constant in cerebral or even cerebellar tumours; the attacks in insular sclerosis are usually slight, and are not the cause of the falls which occur in that disease. Apart from this it occurs in ocular troubles, especially paralysis of the fourth nerve, and I am bound to add from my own experience, in functional disease, though very rarely. I have known two cases of neurasthenia, so-called, in which severe and disabling vertigo occurred; one was sent home from a tropical colony to an eminent London neurologist for operation as a case of cerebellar tumour. He had no signs of organic disease, and after some months' rest returned to his official duties.

(*e*) We do not know why, with lesions and conditions apparently identical, some people suffer from aural vertigo and some do not, or why they suffer at one time and not another. Some authorities, including the late Sir J. Goodhart, maintain that it only occurs in the neuropathic, but I do not think that this, though largely true, can be accepted absolutely. The fact that vertigo is found to be a normal sequel of certain tests has some bearing on this point. Moreover, the presence of a peripheral lesion differentiates it from epilepsy and migraine, though cases associated with nerve deafness are closely allied as to classification. To determine what proportion of those with aural lesions suffer from vertigo would be a very difficult matter for many reasons, some already stated. Only carefully prepared statistics from a large aural clinic would give us even an approximate idea.

I should like to enlarge on the practical importance of these points, and some others—e.g., the diagnostic value of vestibular tests—but I have already exceeded my limits. I am, Sir, yours faithfully,

EDMUND HOBHOUSE.

Brechin-place, S.W., April 7th, 1924.

GASTROMYOTOMY.

To the Editor of THE LANCET.

SIR,—The ideas expressed by Dr. T. C. Clare in his article[1] on gastromyotomy for the cure of gastric ulcer are of great interest. I should like to confirm them from another point of view. At the Yugoslavian Surgical Congress, held in September, 1921, Chief Surgeon A. Gottlieb read a paper[2] which may be unknown to British medical men, from which I give a few extracts in literal translation. My object is not to claim priority for Dr. Gottlieb, but to show that, starting from the same point, he arrived at conclusions differing somewhat from those reached by Dr. Clare. Dr. Gottlieb wrote:—

"I acknowledge that the spasm of the pylorus partly causes the pains, but the principal pains are due to *the tonic spasm in the circular muscle fibres of the gastric segment, in which the ulcer is situated.* These are the muscle fibres which we see in X rays as a continuous circular spasm, usually yielding neither to atropine nor papaverine and not ceasing under the deepest anæsthesia. This spasm is, in my experience, the cause of the continual and extraordinary intense pains, localised by the patients in the epigastrium, and this is the principal impediment to the healing of the ulcer. I see in this

[1] THE LANCET, 1923, ii., 602.

[2] Published in Lijecnicki vijesnik, 1922, No. 2, with a French résumé. A German report appeared in the Zentralorgan für die ges. Chirurgie under the title "Zur operativen Behandlung des pylorusfernen penetr. Magengeschwürs."

continual spasmodic contraction an analogy to the blepharospasm, associated with affections of the conjunctiva or to the spasm of the sphincter at the anal fissure."

There are certain differences in the technique of the operation as used by the two surgeons. Dr. Gottlieb does not dare to make a simple gastromyotomy, because he considers it is not certain to prevent the reuniting of the divided fibres. Therefore, after having carefully divided the muscle fibres of the segment concerned, he also cuts through the mucous membrane and employs this aperture for the establishment of a gastro-enterostomy. Thereby he accomplishes the drainage of the stomach, a principle esteemed by Sir Berkeley Moynihan and others, and also secures the principle of the alkalisation of the gastric juice. Dr. Gottlieb says:—

"Consequently, since 1916, in dealing with 320 ulcers (65 of them penetrating) I have carried out two forms of gastro-enterostomy. For pyloric ulcer or stenosis I perform gastro-enterostomy, exactly as recommended by Bier, that is to say, a retrocolic posterior gastro-enterostomy with the aperture vertical to the longitudinal axis of the stomach, and with a short jejunal loop. When operating for a penetrating ulcer, I divide the circular muscle fibres of the gastric segment on which the ulcer is located, the incision being oblique or parallel to the long axis of the stomach, and corresponding in length to the breadth of the affected segment. . . . Very frequently it is not possible to do a posterior gastro-enterostomy, as the stomach cannot be mobilised, and it is unnecessary because Braun's gastro-enterostomy leads to the same result."

I believe the technique of Clare's operation is no simpler than Gottlieb's. The isolation of muscle fibres, the care necessary to prevent button-holing the mucous membrane, the inversion and suture of the peritoneal coat surely require as much time as a gastro-enterostomy, which is done by Gottlieb—on Bier's recommendation—by simple suture, not taking longer than 20–25 minutes. In cases of large penetrating ulcers it is sometimes difficult, but always possible, to reach the margin of the segment. A similar difficulty naturally applies also to a simple gastromyotomy. A difference exists also in the indications given for the operation. Clare restricts himself to simple uncomplicated ulcers, and refuses to operate on stenosis or hour-glass contraction. Gottlieb has given up the method in the case of simple ulcers, replacing it by a partial gastrectomy. He continues to perform the operation in cases of penetrating ulcers (which now number 80). It is these which offer the greatest difficulty to resection and in which the patients are the weakest. Some years ago I had occasion to see the excellent results obtained from this operation. Pain disappeared the same day, incidentally, I take it, the best proof for the correctness of the view of its origin. Evidently Gottlieb's best results have been reached with penetrating ulcers, and may stimulate Dr. Clare to perform gastromyotomy without gastro-enterostomy on complicated ulcers.

I am, Sir, yours faithfully,

M. GROSSMANN, M.D.,

Assistant at the Medical Clinic, Zagreb, Yugoslavia.

March 30th, 1924.

THE FACTORY SURGEON IN INDUSTRIAL WELFARE.

To the Editor of THE LANCET.

SIR,—The excellent annotation in your issue of March 29th on the Influence of the Factory Surgeon in Industrial Welfare is much to the point. The factory medical service requires extension and supervision, and demands special study on the part of certifying surgeons. It requires to cover a later age and to include re-examination at intervals where excessive heat, moisture, dust, noise, or noxious agents are encountered; also following all conditional certificates. The Home Office medical officers, knowing the conditions of labour and their particular dangers, should inspect and supervise the certifying work of the surgeon. Lectures on industrial diseases are already given at stated intervals; these courses should be enlarged to embrace all industrial risks, especially to youth, and attendance at them made compulsory in the public health diploma course. Another important point in "certifying for fitness" is that no certificate should be given at the surgeon's office or room, but only at the works, factory, or shop, where the actual working conditions can be studied. Given under such circumstances, the certificate constitutes a child's charter of protection or security.

Personal experience warrants the statement that rejections, conditional certificates, and cautionary advice amount to between 10 and 15 per cent. of the young persons presented in certain factory departments. These young people have already received exemption from school and have been previously examined by the school or family doctor. The fact serves to emphasise the necessity of an accurate knowledge of the environment of trade processes before granting "certificates of fitness" for special work. The risks attending factory and industrial life are at present largely unknown to the medical man who is not particularly interested.

I am, Sir, yours faithfully,

Wigan, April 8th, 1924. R. PROSSER WHITE.

THE PANCREAS IN RELATION TO DIABETES MELLITUS.

To the Editor of THE LANCET.

SIR,—I was interested to read Prof. Oertel's article in your issue of April 5th on the Pancreas and Diabetic Metabolism and your annotation thereon, but was surprised to find no reference to the work of Dr. H. H. Dale (Philosophical Transactions, B, 1905), who found that in a pancreas repeatedly stimulated by injections of insulin many alveoli appeared to be converted into islet tissue. He concluded that the islets are not independent structures, but formed by certain definite changes in the arrangement and properties of ordinary secreting cells, bringing about a reversion to embryonic type. In 1908 I wrote: "After all, the nature of the islets does not really settle the question of internal secretion; . . . it does not necessarily require special cells to elaborate it. In the liver we do not find certain bile-producing cells and other glycogenic cells, but all cells seem equally concerned in both the internal and external secretions of the glands. Noel Paton points out that, while the cell-islets are well developed in the duck, the pancreas plays no part in regulating the metabolism of sugar, for excision of the pancreas does not cause glycosuria in that animal." It is interesting to see a reversion to this point of view, although the evidence in favour of the production of the internal secretion of the pancreas by the cell-islets is much stronger than when I wrote those lines.

I am, Sir, yours faithfully,

W. LANGDON BROWN.

Cavendish-square, W., April 8th, 1924.

THE WASSERMANN REACTION IN DIAGNOSIS.

To the Editor of THE LANCET.

SIR,—Your leading article on Syphilis and the Death of the Child, and Dr. J. N. Cruickshank's letter on the Wassermann Reaction in the New-born appearing in your issues of March 22nd and 29th, respectively, afford further clear evidence regarding the limitation of the diagnostic powers of this valuable serological test.

Ever since the introduction of this serum reaction, I have urged the necessity of caution in accepting a positive Wassermann as conclusive evidence of syphilitic infection, and in a small book on the clinical pathology of syphilis and parasyphilis, published in 1912, I expressed the opinion that Wassermann's claim, "If one holds to the necessary preliminary precautions regarding the technique and anamnesis,

then, in cases of a positive reaction it can be said with certainty that the investigated case is syphilitic," could not be accepted without reservation; although the test was undoubtedly a very great help to diagnosis and marked a great advance in clinical pathology.

THE LANCET of May 4th, 1918, contained a note by myself on the Wassermann Reaction, its Use and Abuse, in which I reviewed various cases in which the pathological and clinical evidence appeared to be contradictory, and in which I stated, "I do not think that a positive diagnosis of syphilis can be based on this test alone, unsupported by either history, symptoms or the rapid improvement of doubtful lesions under anti-syphilitic treatment. If cases continue to be diagnosed as syphilitic on a positive Wassermann reaction alone, not only will many non-syphilitic cases be branded and treated as syphilitic, but this extremely valuable test will become discredited." The view that a positive Wassermann reaction was conclusive evidence of syphilis was then generally held, and Colonel L. W. Harrison, in his work on "The Diagnosis and Treatment of Venereal Diseases," published in that year, wrote, "excluding the above-mentioned (chiefly tropical) diseases one can say that a positive reaction justifies a diagnosis of syphilis." The Medical Research Committee in their Special Report Series concluded in No. 21 (published in June, 1918), "The percentage of positive Wassermann reactions in actual syphilis is so high that the test may for all practical purposes be looked upon as specific"; and in No. 23 (published in January, 1919), "We can, however, justly suggest that in the absence of such diseases this positive reaction is conclusive." Since that date evidence has accumulated that the Wassermann reaction, although an extremely useful test, is not pathognomonic, and this conclusion is confirmed by Dr. Cruickshank's investigation of this test in 1000 women and their new-born infants, which enables him to affirm that "a positive Wassermann reaction in a new-born infant is of no value in diagnosis" and "cannot be taken as an indication that the infant is syphilitic."

It is now established that a negative Wassermann is of little value in excluding syphilis in the absence of clinical symptoms, although when symptoms of a doubtful secondary or tertiary nature are present and the test proves negative we are justified in concluding that these lesions are probably *not* syphilitic. A negative reaction in tabes gives no help in diagnosis, but there is a strong probability that a patient giving a negative reaction is not suffering from general paralysis. It is now also established that a positive reaction does not necessarily mean that the individual is syphilitic, and so the time has almost arrived when this important serological test will take its proper and permanent place in the syndrome of symptoms on which correct diagnosis may be based.

I am, Sir, yours faithfully,

H. WANSEY BAYLY.

Harley-street, W., April 4th, 1924.

A CASE OF ANAPHYLAXIS.

To the Editor of THE LANCET.

SIR,—Some interest attaches to a case of a woman, aged 25, admitted to the Isolation Hospital of the County Borough of Southport on Jan. 23rd. The patient was suffering on admission from extensive erysipelas, and there was a record of previous attacks. There had been two deaths in the house from erysipelas during the winter. She had marked albuminuria, and her condition was rendered more grave by the presence of pneumonia. The usual local treatment was given to the lesions and polyvalent antistreptococcic serum up to 100 c.cm. was injected. Complete recovery resulted, contrary to expectations, and patient was discharged Feb. 20th. An attempt was made to provide some lasting immunity by the administration of a sensitised vaccine (Besredka) in an ascending series, and it is a pity that the doctor who took over the case on discharge was unable to give the whole of the prepared doses. The interest is in the anaphylaxis. On March 24th the patient was re-admitted again, suffering from erysipelas, and the next day a tentative dose of two minims of the same serum was given in the skin of the forearm. On March 26th, 18 hours afterwards, a blotchy serum rash appeared, involving the skin of both forearms and the whole of the back. This disappeared in a day or two, and recovery from the primary condition was rapid and without incident.

I am, Sir, yours faithfully,

Southport, April 5th, 1924. G. C. BARNES.

ITALIAN LABELS ON PROPRIETARY MEDICINES.

To the Editor of THE LANCET.

SIR,—The attention of this Association has been called to an article on page 256 of your issue of Feb. 2nd, headed Secret Remedies: Formulas Disclosed by the Makers, and in the course of editorial comments you suggest that these formulas are disclosed by the makers themselves.

The information that I have obtained in respect of such of the formulas quoted as belong to many members of this Association appears to show that, so far as those formulas which appeared on the labels to which you refer are concerned, they were evidently placed there by the importers for their own reasons and without the knowledge or consent of the maker. You are, of course, aware that these preparations go through many channels before they reach the consumer, and it appears to be a common practice for importers in Italy to make up a formula so as to enable them to get the goods through the Customs.

I feel sure you will appreciate these points being brought to your notice, as it is felt that your valued journal does not desire to publish information that tends to suggest that makers of well-known preparations are themselves publishing, or are responsible for any publication of, inaccurate formulas.

I am, Sir, yours faithfully,

J. KENNINGHAM,
Secretary and Treasurer, Association of Manufacturers of British Proprietaries.

4, Verulam-buildings, Gray's Inn, W.C., April 9th, 1924.

List of Members of the Association of Manufacturers of British Proprietaries.

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LONDON PANEL COMMITTEE: POST-GRADUATE INSTRUCTION.

To the Editor of THE LANCET.

SIR,—Courses of post-graduate instruction have been arranged by the London Panel Committee with the assistance of the authorities of Guy's Hospital and Middlesex Hospital to commence in May. The course at Guy's Hospital will be in general medicine, and at Middlesex Hospital in the diagnosis and treatment of cancer. Each course will consist of ten lectures, those at Guy's Hospital commencing on May 1st and those at Middlesex Hospital on May 8th. The classes will be held on Thursday afternoons at 4 P.M., with the exception of one at the Middlesex Hospital, which has been altered to Wednesday, June 25th, to suit the convenience of the lecturer. The fee for each course will be £3 3s., payable in advance to me, and cards of admission will be issued. Early application for inclusion in either of the above courses should be made as the numbers admitted will be limited.

I am, Sir, yours faithfully,

R. J. FARMAN,
Secretary.

51, Chancery-lane, W.C. 2, April 11th, 1924.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Rear-Admiral F. J. A. Dalton is placed on the retd. list at his own request in order to facilitate the promotion of junior officers.

Surg. Comdrs.: W. T. Maydon, to the *Calliope* (on relief); J. C. Bringan, to the *Resolution*; and F. J. Gowans to the *President*, addl., for three months' post-graduate course.

Surg. Comdr. R. H. Atkins to the *Columbine*, addl. for Naval Base at Port Edgar as Senior Medical Officer and Medical Transport Officer.

Surg. Lt.-Comdrs.: M. B. Macleod to the *Victory XI.*, for R.N. Hospl., Portland, and as specialist in ophthalmology; R. A. Brown to the *Columbine*, for R.N. Hospl., S. Queensferry, and for specialist duties.

Surg. Lt.-Comdrs. to be Surg. Comdrs.: J. A. O'Flynn, J. P. Shorten, G. V. Hobbs, F. J. D. Twigg, and G. E. D. Ellis.

Surg. Lt.-Comdrs.: C. E. Greeson to the *Barham*, and A. C. Anderson to the *Victory*, addl. for R.N. Barracks, Portsmouth, and as temporary specialist in ophthalmology.

Surg. Lt. R. W. Nesbitt to be Surg. Lt.-Comdr.

J. F. Kirwan to be Surg. Lt.

Lt. A. D. Phillips to the *Dolphin*.

ROYAL NAVAL VOLUNTEER RESERVE.

N. N. Wade, late temp. Surg. Lt., R.N., is granted an honorary commission as Surg. Lt.-Comdr. in the Royal Naval Volunteer Reserve.

ROYAL ARMY MEDICAL CORPS.

Maj. J. H. Douglass retires on ret. pay.

Temp. Capt. W. Fletcher-Barrett relinquishes his commn. and retains the rank of Capt.

TERRITORIAL ARMY.

Capt. A. J. Brown, from Gen. Hosp. List, to be Maj. (Prov.).

Capt. J. M. Milne resigns his commn. and is granted the rank of Maj.

TERRITORIAL RESERVE OF OFFICERS.

Maj. J. R. Menzies, from the Active List, to be Maj.

TERRITORIAL DECORATIONS.

The King has conferred the Territorial Decoration upon the undermentioned officers: Lt.-Cols. R. E. Bickerton, J. W. Kemp, A. A. W. Merrick, and W. A. Thompson; A. A. Ross (deceased); Majs. E. W. Herrington, A. G. Lovett-Campbell, W. A. Valentine, H. F. Wilkin, and G. T. Willan.

Mr. H. D. Gillies has had conferred on him by the King of Denmark a Commandership of the Order of Dannebrog.

Obituary.

ALEXANDER HAIG, M.D. OXF., F.R.C.P. LOND.

WITH the death of Dr. Alexander Haig last week, at the age of 71, there has passed one whose name was a familiar association with a theory in medicine to which he devoted practically all his attention. Dr. Haig's views on uric acid as a factor in the incidence of gout, rheumatism, cancer, and general conditions of ill-health were at the time of their promulgation received with a considerable amount of scepticism by the profession, nor have subsequent researches by other investigators confirmed his conclusions. Yet, although his theories have been largely discredited, nevertheless, it cannot be doubted that his clear statements and strong belief in his own work have done much to stimulate further and wider research into the causes and ætiology of many diverse conditions with which the presence of uric acid is associated.

Dr. Alexander Haig was a son of the late George Andrew Haig, of Brechin, Forfarshire, and was born in 1853. He was educated at Harrow and at Exeter College, Oxford, and received his professional training at St. Bartholomew's Hospital and at the Rotunda Hospital, Dublin, qualifying as M.R.C.S. Eng. in 1879 and M.B. Oxf. the following year, when he also graduated M.A. His first appointment was as surgeon to the Torbay Hospital, but in 1882 he returned to London where he set up in practice, and also held the appointment of casualty physician to St. Bartholomew's Hospital. Later he obtained the post of physician to the Royal Waterloo Hospital for Children and Women, and physician to the Metropolitan Hospital, to both of which he was consultant physician at the time of his death. Dr. Haig's interest in the subject of uric acid began at an early stage in his career. In 1887 he contributed a paper to the Medico-Chirurgical Transactions on the relation of a certain form of headache to the excretion of uric acid, and his thesis for his M.D., which degree he obtained from Oxford in 1888, dealt with the formation and excretion of uric acid considered with reference to gout and allied diseases. These monographs were rapidly followed by others on the rôle of uric acid in the production of disease, which appeared in various medical journals, and the columns of THE LANCET contain much that originated from him. Among the books of which he was the author are "Uric Acid as a Factor in Causation of Disease," of which the seventh edition appeared in 1908, and his "Uric Acid, an epitome of the subject" reached its second edition in 1902. "Diet and Food in Relation to Strength, Power of Endurance, Training, and Athletics" ran through six editions. In it Dr. Haig stated a clear issue. His view reduced all men and women to mere automata, illustrating this simple principle—9 oz. of albumin per pound body-weight is the art of keeping perfect health.

In appreciation of him Dr. Arthur T. Davies writes:—

"My friendship with and recollections of Dr. Haig go back many years. He was first associated with me as one of the casualty physicians (1885–87) at St. Bartholomew's Hospital and then as one of the assistant physicians (1886) to the Metropolitan Hospital in its transitional days when it was being moved from Devonshire-square, Bishopsgate, to Kingsland-road, N. Haig was a man genial in nature and of high character and integrity. He always seemed to maintain an even mental equilibrium under adverse criticism. He took the keenest interest in his work and in developing his theory on uric acid, to which he devoted an immense amount of labour and research. He was led to start his theory from observing the effects of deleting red meats on his headaches. In a letter which he wrote in 1906 to me he said: 'Of late it has come into my mind that it was perhaps a greater duty to stay at the hospital and help the poor than to make more money by giving all my time to the rich.' Commenting on the break of associations (he is referring to my resignation as physician to the hospital), he said these changes are but the first of a series in which we must eventually part from

everything even life itself and the lesson surely is that there are other and better things not subject to these changes. Haig was a most kind and loyal colleague; his motto was 'once a colleague always a colleague.'"

Dr. Haig married in 1878 Gertrude Mary, daughter of the late James Haig, barrister, of Lincoln's Inn, and had one son and one daughter.

THOMAS PARKER POWELL, L.R.C.P. & S. EDIN., L.R.F.P.S. GLASG.

THE sudden death of Dr. T. P. Powell of Lincoln, occurred on March 29th while he was engaged on his professional duties, and by his death Lincoln has lost a well-known local practitioner. Born in 1861, Dr. Powell was the son of the late Mr. T. Wood Powell, a Breconshire analytical chemist. Choosing medicine as his profession, he proceeded to the Royal Colleges, Edinburgh, and the Anderson College, Glasgow, obtaining the triple qualification L.R.C.P. & S. Edin., L.R.F.P.S. Glasg. in 1894. After qualifying he joined Dr. P. Thompson, of Retford, as assistant, and from there he accepted the appointment as senior medical officer to the Manchester Unity Order of Oddfellows Medical Institution, Lincoln. At that time the friendly societies' medical institutes were going through a difficult period of their history, and their relations with outside medical men were far from satisfactory. For 28 years Dr. Powell worked steadily on towards the realisation of his ambition to raise the standard of friendly society medical work. During the war he was medical officer to the Staffordshire Regiment and naval forces in Lincoln, and later a member of the Pensions Board. A man of few words and determined character, quick to take offence but equally quick to forgive, Dr. Powell held the confidence and affection not only of his patients, but of his medical brethren, by whom he is sincerely mourned.

DOUGLAS ARTHUR REID, M.D. EDIN., M.R.C.S. ENG.

Dr. Douglas A. Reid, who died recently, at his residence in London, in his ninety-first year was for many years a prominent figure in the public life of Tenby, Wales. He was born at Portsea, Hampshire, and at the age of 16, in 1849, was apprenticed to Dr. James Henderson, the surgeon of Portsmouth Dockyard. A year later he entered at King's College, London, as a student, and in 1853 he proceeded to the University of Edinburgh, where he graduated as M.D. Returning to London, he passed the examination of the College of Surgeons and Apothecaries' Hall in June, 1854. Following a short residence at the Brompton Hospital for Consumption as clinical assistant, Dr. Reid entered the army as assistant surgeon at the outbreak of the Crimean War, and was gazetted to the 90th Light Infantry. Throughout the Siege of Sebastopol he was attached to that regiment and was frequently on duty in the trenches during the winter of 1855. He took part in the attack on the Redan on June 18th and in the storming of Sebastopol on Sept. 8th of the same year, and was subsequently awarded the Crimean Medal with the clasp for Sebastopol, and the Turkish Medal. In 1856 he returned to England, and leaving the service he commenced practice in Pembroke as the successor of Dr. Paynter, then the oldest practitioner in the town. In 1863 he established the Pembroke and Pembroke Dock Infirmary, and in 1866, during the cholera epidemic of that year, he was appointed by the Local Government Board as extra medical officer to the Pembroke Union to assist in coping with the epidemic. It is recorded that he had upwards of 200 cases in his charge in the course of six weeks and he succeeded in keeping the death roll below 10 per cent. In 1868 he was made a magistrate for the Borough of Pembroke, and from 1873 to 1875 was a member of the town council of the borough. From 1857 to 1874 he was a surgeon of the old Castlemartin Yeomanry Cavalry. Dr. Reid settled in Tenby in 1875, where he remained for nearly 40 years. For long a member of the town council, at the time of his death he was the senior justice of the peace for the borough. He had also been a trustee of the Tenby Charities and an Income-tax Commissioner.

For many years there were few important movements in the town in which he was not interested, and of his capabilities a correspondent writes as follows:—

"Dr. Douglas Reid in his prime—and his prime extended to a much more advanced age than that of most men—was possessed of a boundless enthusiasm. Whatever he undertook was carried through with an energy that swept opposition off its feet, yet with an honesty of purpose that even his opponents were forced to admit and admire. He had a vivid sense of humour, a keen wit, and the power of ready repartee. Optimistic in outlook, he refused to see the dark side and the difficulties of life, and to the very end he was always seeking 'for some new thing,' and some fresh cause for which to think and work. In addition to a lifelong interest in his profession, he threw himself with characteristic keenness into politics, being a whole-hearted supporter of the Conservative cause. As M.O.H. of the town in which he lived he was ever battling for the reform of abuses and the furtherance of its health and general interests, and it was owing largely to his untiring work that the first tuberculosis sanatorium in West Wales was instituted. The loss of his youngest and only surviving son, Sir Archibald Reid, early this year was a blow too severe for even his vigorous constitution, and the shock hastened his death."

His wife died in 1912, but he is survived by three daughters, to whom we extend our sincere sympathy.

THE LATE DR. Q. M'LENNAN.—We regret to record the recent death of Dr. Quintin M'Lennan at the age of 71, who for 40 years had practised in the West-end of Glasgow. He had been a visiting surgeon to the Royal Infirmary, Glasgow, and at the time of his death was the senior honorary consulting surgeon to that institution; and he had also served on the surgical staff of the Royal Hospital for Sick Children. He was medical examiner to the Board of Trade. Dr. M'Lennan took a great interest in the literature and music of his country.

THE LATE DR. A. J. COUPER.—Dr. Alex. Johnston Couper, who died recently, graduated at Glasgow University in 1907, and acted for a time as a demonstrator of anatomy in the University. He then took up practice, and at the same time became attached to the surgical staff of the Royal Infirmary, Glasgow, where he was an assistant surgeon at the time of his death. During the war he served in Salonica with the Royal Army Medical Corps.

THE LATE DR J. P. WILLIAMS.—The sudden death of John Prichard Williams, M.R.S.C., B.Ch., of Southgate-road, Potter's Bar, Middlesex, at the early age of 30, occurred as the result of appendicitis two weeks ago. Dr. Williams was educated at University College, Cardiff, and at Westminster Hospital, and received his medical degree in 1917. During the war he held the rank of Captain in the R.A.M.C., and from 1915 to 1917 he served with the British Expeditionary Force in Russia. Since 1920 Dr. Williams was in practice in Potter's Bar, and was a member of the honorary staff of Potter's Bar Cottage Hospital. To his widow and little daughter we extend our heartfelt sympathy.

THE LATE DR. J. S. MACKAY.—John Sutherland Mackay, M.D., D.P.H. Ed., died in Edinburgh on March 30th, aged 77. He was the eldest son of the Manse at Lybster, Caithness, and studied at Aberdeen, Edinburgh, and St. Andrews, and after graduation took the appointment of medical officer to the Rio Tinto Copper Co., in Spain. He put the medical department of this great mine on lines which are retained to-day, conferring great benefits on the workmen and their families, for whose welfare he was an indefatigable worker. The Spanish Government recognised his labour during the cholera epidemic of 1885 by conferring on him the Cross of Isabel la Católica. After nine years in Spain he returned to Scotland, and after practising for some years in Kirkcaldy he was appointed medical officer of health for that borough. He is survived by his only daughter.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—A paper on Bismuth Therapy will be read before the Society at 11, Chandos-street, W. 1, on April 25th, at 8.30 P.M., by Major A. T. Frost. A discussion will follow, in which Dr. H. H. Dale will take part, and preceding the discussion there will be a demonstration of clinical cases.

Medical News.

UNIVERSITY OF LONDON.—A lecture on the Influence of Tropical Climate on Man will be given at University College (Gower-street, W.C. 1), by Prof. Dr. C. Eijkman (professor of hygiene and microbiology in the University of Utrecht), at 5 P.M., on Friday, May 2nd. The chair will be taken by Prof. H. R. Kenwood. The lecture will be delivered in English, and admission is free.

UNIVERSITY OF LIVERPOOL.—At examinations held recently the following candidates were successful:—

DIPLOMA IN TROPICAL MEDICINE.

J. C. Carson, B. L. Chopra, M. J. Hardy, F. J. C. Johnstone, J. J. Keirans, G. Maclean, W. C. Mathur, and Elizabeth M. Theron.

UNIVERSITY OF DURHAM: FACULTY OF MEDICINE.—At the Convocation held on March 29th the following degrees, diploma, and licence were conferred:—

Bachelor of Medicine and Bachelor of Surgery.—Sarah B. Allan, Robert B. Allen, Alfreda M. Beadle, Derek C. Bell, Edgar F. H. Bell, Robert L. Bell, Norman Capstaff, John B. S. Guy, James A. Hislop, Walter A. Hogg, James S. Johnson, Johannes Fredericus Van Wyk Krige, John H. Laydon, Laurence V. McNabb, George M. Miller, Hector C. Reed, Sydney D. Rowlands, Gerald F. Smith, Thomas E. Stoker, Phyllis M. Walker.

Bachelor of Hygiene.—Edward T. Colville.

Diploma in Public Health (D.P.H.)—Edward T. Colville.

Licence in Dental Surgery (L.D.S.)—Leslie T. D. Heppell.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—At a quarterly meeting of the Council of the College, Sir John Bland-Sutton, President, in the chair, the Jacksonian Prize for the year 1923 was awarded to Mr. Harold R. Dew (Melbourne), and a certificate of honourable mention and an honorarium were awarded to Mr. John Howell Evans. The subject of the prize for 1925 is the Pathology and Treatment of Lymphadenoma (Hodgkin's Disease).—The John Tomes Prize for 1921–23 was awarded to Mr. W. Warwick James, O.B.E., Fellow and Licentiate in Dental Surgery of the College, for his scientific work on the eruption of teeth, orthodontics, and the pathology of dental caries.—Dr. Arthur Longley Whitehead, senior ophthalmic surgeon, General Infirmary, Leeds, and Dr. Arthur Robinson, professor of anatomy, University of Edinburgh, were elected Fellows of the College, under Section 5 of the Charter of 15 Vict., relating to members of 20 years' standing.—Miss Pera Rosaline Cecilia Crawford, of the London School of Medicine for Women, was appointed Begley Student for the ensuing three years.—Mr. James Sherren, C.B.E., was elected one of the two representatives of the College on the Senate of the University of London in the vacancy occasioned by the retirement of Mr. Raymond Johnson. The diploma of M.R.C.S. was conferred upon Paul H. T. Thorlaksson, M.D. Manitoba, and the licence in dental surgery was conferred upon Jacob H. Ingel, Middlesex and Royal Dental Hospitals.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The Fellowship of Medicine programme of special courses for the months of April–May includes courses in various specialties, as well as a two weeks' intensive course at the Hampstead General Hospital in association with the North-Western Fever Hospital and Paddington Green Children's Hospital. The programme covers all departments of clinical work and a formal lecture or lecture-demonstration every afternoon. A further fortnight's course will be held at the Hospital for Diseases of the Skin, Blackfriars, from April 28th to May 10th, comprising instruction in the out-patient department and venereal cliniques. From May 5th to 31st there will be a special course in ophthalmology at the Central London Ophthalmic Hospital, consisting of clinical lecture-demonstrations dealing with subjects of interest to general practitioners. A month's course in psychological medicine has been arranged at the Maudsley Hospital, Denmark Hill, from May 5th to 30th, and will consist of lecture-demonstrations on the psychoneuroses, practical aspects of mental deficiency, &c. A course in venereal diseases will be given at the London Lock Hospitals (Dean-street and Harrow-road) from May 5th to 31st, and will include clinical work daily in the wards and out-patient departments at both hospitals with a special lecture by a member of the staff at 91, Dean-street each day. A fortnight's course will be given at the Infants Hospital from May 12th to 24th. The programme deals with infants' diseases from all sides, and consists of clinical demonstrations, "round table" consultations, lectures, &c. From May 12th to 24th a course in proctology will be held at St. Mark's Hospital for Diseases of the Rectum. The course will include operations, demonstrations, and lectures by members of the staff. Also, from May 12th to 30th an intensive course in laryngology, rhinology, and otology will be held at the Central London Throat, Nose, and Ear Hospital. Clinical demonstrations, lectures, &c., will be given each day from 9.30 A.M. to 5 P.M., and for those desiring it an operative surgery class will be arranged for. There will be a special intensive course at the Prince of Wales's General Hospital, Tottenham, from May 19th to 31st, details of which will be announced later. Copies of the syllabus of each of the foregoing courses can be obtained on application to the Secretary to the Fellowship of Medicine, at 1, Wimpole-street, W. 1.

THE King has given permission to Dr. William Hastings, O.B.E., Deputy Director-General, Egyptian Government Health Service, licence and authority to wear decorations of the Order of the Nile (second class) which have been conferred upon him by the King of Egypt in recognition of valuable services rendered by him.

MANCHESTER RADIUM INSTITUTE.—The activities of this Institute are growing rapidly. During the past year 908 in-patients were treated, and the number of attendances by out-patients was 5729. The Institute is doing research work as well as practising curative treatment, and to aid in these an assistant radiologist, Dr. G. E. Birkett, has been appointed. The deficit in the annual working account for the past year was £1734. Effort is being made to secure a steady subscription.

ANCOATS HOSPITAL, MANCHESTER.—During the year the income of the hospital and convalescent home was £23,165 and the expenditure £24,766, with a deficit on the year's working of £1600. In 1922 there were 2307 in-patients, 8937 out-patients, and 18,912 accident cases. The cost per bed occupied per annum was £131 14*s.* Dr. A. E. Barclay formally opened the new X ray department, which, with certain structural alterations, cost £2500. The resident medical and surgical staff has been increased to five.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.—A post-graduate course on Diseases of the Nervous System will be held at the hospital from May 5th to June 27th. The general course will consist of clinical lectures and demonstrations, teaching in the out-patient department, and pathological lectures and demonstrations. A course of clinical demonstrations, chiefly on Methods of Examination of the Nervous System, will be given, and a course of lectures on the Anatomy and Physiology of the Nervous System will be arranged if there are sufficient applicants. Further information may be obtained from the Secretary of the Medical School of the Hospital, Queen-square, London, W.C. 1.

BANTING RESEARCH FOUNDATION.—It is proposed to raise by public subscription in Canada and the United States a sum of at least £100,000 for the purpose of establishing a Foundation in recognition of the discovery and development of insulin therapy. The purposes of the Foundation are (1) to provide further funds for the support of the Banting and Best Chair of Medical Research at the University of Toronto; (2) to establish a fund for the adequate financial support of such scientific workers as may have proposed to undertake the investigation of definite problems of medical research, for whom funds are not otherwise available. Such assistance may be given to persons working in the University of Toronto or elsewhere. The trustees for the collection and expenditure of the fund are prominent members of the University of Toronto, the medical members including Dr. W. E. Gallie, Prof. J. G. Fitzgerald, and Prof. V. E. Henderson.

ST. ANDREW'S HOSPITAL.—The eleventh annual report of St. Andrew's Hospital, Dollis Hill, N.W., shows a steady increase in the work of caring for patients who, while not suitable subjects for free treatment in charitable institutions, are unable to meet the charges necessary to secure adequate medical or surgical treatment in private nursing homes. Patients are admitted to this hospital only on the recommendation of their own medical adviser. The needs of the institution are, however, great, for, apart from the cost of maintaining an increase of free beds, there is a debt of over £1000, while the extension of the X ray department, the establishment of an electrical department, and further accommodation for the nurses and domestic staff would add to the efficiency of an institution which already fulfils a very useful purpose. During the year under notice the number of patients treated was 540, as compared with 406 in 1922. There was also a considerable increase in the number of operations performed, and the average number of patients resident in the hospital also rose by 28 per cent. The total income was £6826 and the expenditure £6988.

DONATIONS AND BEQUESTS.—By will the late Mr. Thomas Utley, of West Didsbury, Manchester, left among other bequests £200 each to the Manchester Northern Hospital for Women and Children, the Manchester Hospital for Consumption and Diseases of the Throat, St. Mary's Hospital for Diseases of Women and Children, and the Northern Counties Hospital for Incurables.—The late Sir George Wood Rhodes, of Pont-street, S.W., who left estate of the gross value of £342,363, with net personality £336,434, left the bulk of his property, failing issue of his children, to the Manchester Royal Infirmary; the Manchester Children's Hospital, Pendlebury; the Manchester and Salford Hospital for Skin Diseases; the Manchester Royal Eye Hospital; St. Mary's Hospital, Manchester; Henshaw's Blind Asylum, Old Trafford; the Royal Blind Pensions Society; Gardner's Trust for the Blind; and to the Hospital for Sick Children, Great Ormond-street; the Queen's Hospital for Children, Hackney-road; Charing Cross Hospital; Guy's Hospital; and St. George's Hospital, London.—Under the will of the late Sir Henry Lucy ("Toby M.P.") the testator left among other bequests the income of £3000 to be divided between the Parochial Nursing Fund, the Dispensary, and the local branch of the National Lifeboat Institution at Hythe; £1000 to the Salop Infirmary, to endow a cot in the name of "Henry Lucy"; £1000 to the School for the Indigent Blind, Liverpool, to endow a "Henry Lucy" cot "in memory of my grandfather for many years master of the school"; and £1000 to the Liverpool Northern Hospital to endow a bed "in the name of my mother, Margaret Kemp Lucy." To the Westminster Hospital the testator left £1000 to endow a bed in the name of Lady Lucy, and £1000 each (payable after the death of his wife) to the following institutions: Alexandra Hospital for Children, Bloomsbury; Royal Ear Hospital; Royal Eye Hospital; Seamen's Hospital Society; Royal Hospital for Children and Women, Waterloo Bridge-road; Royal Orthopædic Hospital; Central London Throat Hospital; East London Orphan Asylum; Liverpool Infirmary for Children; Children's Convalescent Home, West Kirby, Cheshire; Ragged School Union Holiday Homes for Poor Children, London; Belgrave Hospital for Children, London; Cancer Hospital, Fulham-road, London; Charing Cross Hospital; Chelsea Hospital for Women; City of London Hospital for Diseases of the Chest; East London Hospital for Children and Dispensary for Women; Evelina Hospital for Sick Children; Guy's Hospital; Hospital for Sick Children, Great Ormond-street, London; King's College Hospital; London Hospital; Metropolitan Hospital, London; Middlesex Hospital; North-Eastern Hospital for Children, London; North London Consumption Hospital; Poplar Hospital; Royal Free Hospital, London; St. Bartholomew's Hospital; St. George's Hospital, London; St. Mary's Hospital, Paddington, London; St. Thomas's Hospital, London; West London Hospital, Hammersmith-road, London; and Victoria Hospital for Children, Chelsea, for the endowment of cots or beds in the name of "Nancy Lucy." These institutions will also participate in the residue of the property.—The late Mr. F. C. Pilkington left by will £10,000 to the Convalescent Home, Stillorgan, co. Dublin.

Parliamentary Intelligence.

HOUSE OF COMMONS.

WEDNESDAY, APRIL 9TH.

League of Nations Opium Conferences.

Mr. LUMLEY asked the Secretary of State for Foreign Affairs whether he was aware that the American Government had laid before the committee of preparation for the League of Nations Opium Conferences proposals providing that no State should rely on revenue from the production or sale of narcotic drugs except to finance the control of traffic in such narcotics; and whether it was the intention of His Majesty's Government to endorse this principle.—Mr. PONSONBY (Under-Secretary for Foreign Affairs) replied: I am informed that certain suggestions have been submitted to the committee of preparation by the United States representative for their consideration. It would be premature, and would prejudice the work of the committee, for H.M. Government to express any views with regard to these or any other proposals that may be put before the committee while they are still under the consideration of the committee.

Mr. AYLES asked the Prime Minister whether the committee appointed to prepare the agenda for the international opium conferences convened by the League of Nations had yet met; who was the British representative; and whether any statement could be made regarding the decisions taken.—Mr. R. MACDONALD replied: The committee has met twice. The British representative on it is Sir Malcolm Delevingne, who represents H.M. Government on the opium advisory committee of the League of Nations. No decisions have yet been taken, but the committee will in due course submit a report to the League of Nations, by which it has been appointed.

The Spahlinger Treatment.

Mr. SMITH-CARINGTON asked the Minister of Health when the Spahlinger treatment would be available for ex-Service men who desired it.—Mr. WHEATLEY replied: I would refer the hon. Member to the reply which I gave on this subject on March 12th to Sir W. de Frece. When supplies of Mr. Spahlinger's remedies become available in this country it will be open to the medical officers responsible for the treatment of ex-Service men to utilise these remedies in the treatment of their patients if they consider it desirable.

Medical Reports to Board of Control.

Mr. COSTELLO asked the Minister of Health if he would furnish particulars of the diagnosis sent in to the Lunacy Commissioners (as required by statute) within seven days after admission by the medical superintendents, in the case of the 22 sane persons mentioned in the last report of the Board of Control as having been wrongfully certified; would he procure from the Board the invalidation of the certifications and the removal of the names of these persons from the list of the certified; and would he state under what legal sanction their detention was continued for periods extending in some cases to as much as 50 days.—Mr. WHEATLEY replied: The Board of Control are not authorised to disclose the medical reports furnished to them by medical superintendents with regard to patients under their care. But I will supply the hon. Member with a statement showing the circumstances in which each of these cases was detained under observation. It is not possible to invalidate the certification of the persons mentioned; they were sent to the mental hospitals under proper legal authority (by order of a justice in 21 cases and by warrant of the Home Secretary in one case). Their names were, however, removed from the list of certified patients on discharge from the institutions. They were detained at the hospitals on the authority of the justices' orders and Home Secretary's warrant for periods of varying lengths to allow of special observation by the medical superintendents and further reports to the Board of Control.

Patients in Private Asylums.

Mr. COSTELLO asked the Minister of Health what regulations, if any, had been made by the Board of Control to ensure that where no prejudicial certificate had been sent into them patients in private asylums who had not been seen by a magistrate should receive the statutory notice of their right of appeal to a judicial authority, and that when the manager of the institution had neglected his duty in this respect such neglect, which was described in the Act as a misdemeanour, should in future be followed by a prosecution of the offender.—Mr. WHEATLEY replied: No regulations are required, but the Board of Control have drawn the attention of the authorities of institutions receiving private patients to the requirements of Section 8 of the Lunacy Act, 1890. I do not consider that a prosecution should necessarily be undertaken in all cases of failure to observe the requirements referred to.

Mr. COSTELLO asked the Minister of Health whether, in view of the declaration made by the Board of Control that they had been advised that neglect on the part of a medical superintendent to serve a private patient with notice of his right of appeal to a magistrate did not invalidate the reception order under which he was committed, he would take steps to enforce the right of a British subject to have his case heard and investigated by some judicial authority prior to imprisonment.—Mr. WHEATLEY replied: The point will no doubt be considered by the Royal Commission which it is proposed to appoint at an early date.

Danger of Proprietary and Patent Foods.

Mr. DIXEY asked the Minister of Health whether he was aware of the serious danger to infant life and welfare arising from the widespread sale of proprietary and patent foods, consisting principally of starch; and whether he proposed to take any and what steps to enable local authorities to exercise control over the sale of unsuitable and unwholesome preparations advertised as infants' foods.—Mr. WHEATLEY replied: The matter has been the subject of investigation by my department, and I will consider what action it may be desirable and practicable to take in the direction which the hon. Member suggests.

Mr. HORE-BELISHA asked the Minister of Health what number of hours per day were worked by the asylum workers, inclusive of meal times; and whether he would arrange to bring these workers within the scope of a projected Eight Hours Bill.—Mr. WHEATLEY replied: There is no general rule, but the hours usually range from 48 to 60 per week. There is considerable difference of opinion among medical superintendents as to what hours are best for the patients and the nurses, and the subject is now under the consideration of a Departmental Committee appointed to consider the nursing service in county and borough mental hospitals, and in what directions it can be improved. I should prefer to await their report before answering the last part of the question.

Sickness Insurance Benefit.

Major EDMONDSON asked the Minister of Health whether, seeing that under the National Health Insurance Act only seven days' pay was granted for ten days' sickness, he would state why, in the case of sickness of such duration, the commencement of payment could not be dated from the first day of illness.—Mr. WHEATLEY replied: Under the Act sickness benefit is only payable from the fourth day of incapacity, but any approved society which is found on valuation to have a disposable surplus after making provision for the normal benefits to which its members are entitled, may out of such surplus provide, as an additional benefit, for the payment of sickness benefit from the first day of incapacity. Out of 6659 societies and branches in England which have a disposable surplus on the first valuation, only 66, however, elected to adopt this form of additional benefit. An increase of the weekly contribution would be necessary in order to place societies in a position to pay benefit from the first day otherwise than by recourse to their surplus funds.

After-care Colonies for Tuberculosis.

Mr. AYLES asked the Minister of Health whether he could give the number of after-care colonies for men and women who have been through sanatoria for tuberculosis now in existence; the number of cases which they had accommodated; and what the result of the establishment of such colonies had been.—Mr. WHEATLEY replied: There are at present three after-care colonies accommodating some 100 married men and their families, and 80 single men. I am aware also of two non-residential employment centres and one centre partly non-residential. I am advised that establishments of this kind must be regarded as still in the experimental stage, though the results so far obtained are hopeful.

Measles Statistics.

Mr. D. G. SOMERVILLE asked the Minister of Health the present percentage of cases of measles per thousand of the population; what was the percentage of similar cases in other countries which compiled statistics on the subject; and whether there was any explanation of the frequency of the malady in this country as compared with other countries.—Mr. WHEATLEY replied: No complete statistics are available as to the incidence of measles in this country, as the disease is no longer notifiable, except in a small number of districts, and the statistics available in regard to certain foreign countries in which the disease is notifiable do not enable me to give the figures asked for by the hon. Member. As regards the third part of the question, I may say that recent information indicates a somewhat widespread increase in the prevalence of measles in other European countries and the United States, as in this country.

Maternity Outfits.

Mr. AYLES asked the Minister of Health whether he would consider favourably any requests from health committees to be allowed to provide maternity outfits in necessitous cases.—Mr. WHEATLEY replied: I am prepared to consider any such applications.

Cost of Tuberculosis Treatment.

Mr. WILLIAM JOWITT asked the Minister of Health what was the total expenditure incurred by the Imperial Exchequer in the year 1923 upon the treatment of tuberculosis.—Mr. WHEATLEY replied: The total amount paid from the Exchequer during the financial year 1923–24 in respect of the tuberculosis schemes in England and Wales, including capital grants-in-aid of sanatoria, was £1,818,179. With regard to Scotland, a question should be addressed to the Secretary for Scotland.

Glandular Tuberculosis and Bovine Infection.

Mr. WILLIAM JOWITT asked the Minister of Health whether there were any statistics or other information available to his department to show the extent to which the prevalence of glandular tuberculosis was due to infection from bovine tuberculosis; and, if so, whether he would state the result of such statistics or information.—Mr. WHEATLEY replied: The most recent statistics on this subject of which I am aware are those published in 1922 as the result of a bacteriological examination of a number of cases of cervical gland tuberculosis undertaken on behalf of the Medical Research Council. These statistics showed that the percentage of cases due to bovine infection was highest in children under 5 years of age, and that although there was a progressive diminution in later age periods, the proportion of adult cases of bovine infection was not inconsiderable. It should, however, be stated that the number of children under 5 who were examined for the purposes of this test was comparatively small.

THURSDAY, APRIL 10TH.

Private Asylums in England.

Mr. PERCY HARRIS asked the Secretary of State for the Home Department how many asylums there were in England which were administered for private gain: the number of inmates in these asylums; and how many of the proprietors had degrees in psychological medicine.—Mr. GREENWOOD (Parliamentary Secretary to the Minister of Health) replied: There are 56 such institutions in England. On Jan. 1st, 1924, there were 170 voluntary boarders and 2797 certified patients resident. Information as to how many of the proprietors have degrees in psychological medicine is not available. My hon. friend is, no doubt, aware that the proprietors are not necessarily the licensees and need not be medical men.

FRIDAY, APRIL 11TH.

Summer Time Bill.

Sir KINGSLEY WOOD moved the second reading of the Summer Time Bill, a measure the main object of which, he said, was the permanent establishment of a six months' period of summer time from the first Sunday in April to the first Sunday in October. He claimed that opinion and propaganda in favour of permanent summer time had undoubtedly been growing during the eight years it had been in operation. This Bill would cost no money, but would rather save a great deal. He urged that it was very desirable that our own summer time should coincide with Continental summer time. Considerable objection had been raised on the ground that the health of the children would be affected. Nearly all the authorities who held that the Act was prejudicial to children took the view that this was due, not to any defect inherent in the Act itself, but to the fact that the parents did not use it rightly. On the assumption that parental control was effective the authorities responsible for the education of 4,000,000 elementary school-children would favour the Act and those responsible for only 500,000 would be against it. The British Medical Association were unanimously in favour of the proposal on the ground that it would do a great deal for the health of the community, including children.

Mr. A. HENDERSON (Cardiff), in seconding the motion for the second reading, said that he thought that the Bill would do a great deal towards increasing the sum total of happiness and enable the country to develop towards that stage when we might have an A1 nation.

Major COLFOX moved the following amendment: "That this House declines to proceed with a Bill which seeks to upset the compromise between all the interests concerned reached less than two years ago, and which would have a most prejudicial effect on the inhabitants of agricultural and mining districts."

Mr. DUFFY seconded the amendment.

Mr. R. DAVIES (Under-Secretary to the Home Office) said that this was a question for the House to decide, but in the view of the Home Office and the Government it was desirable that the Bill should be read a second time.

Mr. A. HENDERSON (Home Secretary) undertook on behalf of the Government that some of the points raised in the debate would be taken into consideration on the Committee stage.

On a division the second reading was carried by 169 votes to 129—majority, 40.

Women Medical Examiners in Criminal Cases.

The DUCHESS OF ATHOLL asked the Secretary for Scotland whether, with regard to women medical practitioners acting as medical examiners in certain criminal cases, he would state the names of the women practitioners whose services had been so utilised in Edinburgh and Glasgow, and the number of occasions since the issue of Lord Advocate Morison's letter in October, 1920, on which they had been employed in the courts of Edinburgh and Glasgow respectively.—Mr. ADAMSON replied: With regard to Glasgow, I am informed that three women medical practitioners who

have been mainly employed in cases of the nature referred to are the late Dr. Mabel Jones, Dr. Elizabeth Smith, and Dr. Madeline Archibald. I regret that it is impossible to give particulars of the number of occasions on which their services have been utilised. With regard to Edinburgh, I find that owing to a misapprehension I was improperly informed when I answered the noble lady's question on Feb. 18th. I understand that in the case of post mortem inquiries the Procurator-Fiscal there has from time to time utilised the services of women practitioners, but that in cases of the kind specially mentioned in Lord Advocate Morrison's circular of October, 1920, women practitioners have not as yet been employed. I would point out, however, that, in general, in cases of assault or offence against the Criminal Law Amendment Acts it is necessary to have an immediate medical examination, which in practice has to be carried out on the instructions of the police by a police casualty surgeon. A further examination after the case is reported to the Procurator-Fiscal is rarely necessary.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Friday, April 25th.

STUDY OF DISEASE IN CHILDREN: at 5 P.M. (Cases at 4.30 P.M.)
Cases:
Dr. J. D. Rolleston: Herpes Recurrens.
Other cases will be shown.
Paper:
Dr. Forrest-Smith and Dr. Geoffrey Fildes: The X Ray Diagnosis of Pyloric and Duodenal Stenosis in Infants, to be followed by a discussion, in which Dr. Bertram Shires and others will take part.
Members of the Section of Electro-Therapeutics are specially invited to attend and to take part in the discussion.

EPIDEMIOLOGY AND STATE MEDICINE: at 8 P.M.
Paper.
Dr. Louis W. Sambon: The Elucidation of Cancer.
N.B.—It is hoped that Members of other Sections will attend this Meeting.

ELECTRO-THERAPEUTICS: at 8.30 P.M.
Paper:
Prof. Stefan Jellinek (Vienna): Some New Observations and Experiments in Electricity.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W.
FRIDAY, April 25th.—8.30 P.M. A paper will be read by Major A. T. Frost on Bismuth Therapy. A discussion will follow in which Dr. H. H. Dale will take part. The discussion will be preceded by a demonstration of Clinical Cases.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, April 21st.—College closed.
TUESDAY.—10 A.M., Dr. Drummond Robinson: Gynæcological Operations. 12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Department.
WEDNESDAY.—2 P.M., Dr. Burnford: Medical Wards. 2 P.M., Dr. Pernet: Skin Department. 2.30 P.M., Mr. Donald Armour: Surgical Wards.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Department. 2 P.M., Mr. Bishop Harman: Eye Department. 2 P.M., Mr. MacDonald: Genito-Urinary Department.
FRIDAY.—11 A.M., Dr. McDougal: Electrical Department. 2 P.M., Dr. Burrell: Medical Out-patients. 2 P.M., Mr. Sinclair: Surgical Out-patients.
SATURDAY.—9.30 P.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.
Daily 10 A.M. to 6 P.M., Saturdays 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

NORTH-EAST LONDON POST-GRADUATE COLLEGE. (Prince of Wales's General Hospital.)
(at 4.30 P.M.)
TUESDAY, April 22nd.—Dr. L. R. Yealland: Clinical Demonstration of Cases.
WEDNESDAY.—Dr. J. Browning Alexander: Asthma.
THURSDAY.—Mr. J. Bright Banister: Injuries Sustained in Labour.
FRIDAY.—4 P.M., Mr. J. Howell Evans: Orchitis and Epididymitis.

Appointments.

BRUCE, G. GORDON, M.B., Ch.B., L.R.C.P. Lond., F.R.C.S. Eng., has been appointed Honorary Assistant Surgeon to Royal Aberdeen Hospital for Sick Children.
BUCKNELL, M. ASTON C., M.B., B.S. Lond., M.R.C.S., L.R.C.P., D.P.H., Bacteriologist for the City of Bradford.
FOULKES, P. G., M.B., B.S. Lond., L.R.C.P. Lond., M.R.C.S., Certifying Surgeon under the Factory and Workshop Acts for King's Lynn.
YOUNG, ROY F., M.B., B.C. Camb., Visiting Surgeon to the Western Infirmary, Glasgow.
Edinburgh Royal Infirmary: THOMPSON, MABEL, M.B., Ch.B., non-Resident House Physician; WILLIAMSON, A. B., M.B., Ch.B., BENNETT, MARGARET, E., M.B., Ch.B., non-Resident House Surgeons; MITCHELL, BETTY, M.B., Ch.B., MUNRO, J. E., MARGARET, M.B., Ch.B., and POPPER, O. O., M.B., Ch.B., Clinical Assistants.

Vacancies.

For further information refer to the advertisement columns.

Birmingham City.—Asst. M.O. £750. Also M.O. for Maternity and Child Welfare Work. £600.
Bradford City.—Asst. School M.O. £600.
Croydon County Borough.—Dental S. £600.
Gravesend Hospital.—Sen. H.S. £100.
Hemel Hempstead, West Herts Hospital.—Res. M.O. £200.
Hospital for Consumption and Dis. of Chest, Brompton, S.W.—Asst. in Dept. of Pathology. £250.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—H.P. £100.
Leicester Royal Infirmary.—Second H.P. £125.
London Lock Hospital, Dean-street and Harrow-road.—Surg. Reg.
London Temperance Hospital, Hampstead-road, N.W.—Med. Registrar. 40 guineas.
Manchester, County Mental Hospits Prestwich.—A.M.O. £440 17s.
Mid-Wales Counties Mental Hospital, Talgarth, Breconshire.—Asst. M.O. £350.
R.A.M.C. Territorial Army.—Young Med. Practitioners.
Rochester, St. Bartholomew's Hospital.—Res. H.S. £250.
Sutton, Surrey, Downs Hospital for Children.—Second Asst. M.O., £560.
West London Hospital, Hammersmith-road, W.—Hon. Med. Reg.
Westminster Hospital.—Surg. Reg. and Med. Reg. Each £150.
Whitelands Training College, Chelsea, S.W.—M.O.

Births, Marriages, and Deaths.

BIRTHS.

MALHOTRA.—On March 15th, at Philip's Nursing Home, Lahore the wife of Captain R. C. Malhotra, I.M.S., of a daughter.

MARRIAGES.

MANN—GOULD.—On April 10th, at St. Mary's Baptist Church, Norwich, Surgeon-Commander Fairman Rackham Mann, R.N., to Hilda Mary, younger daughter of H. P. Gould, of Saxlingham, near Norwich.

DEATHS.

COCK.—On April 6th, suddenly, at Morton-crescent, Exmouth, John Cock, M.R.C.S., L.R.C.P., aged 68.
HAIG.—On April 6th, at Inverness-terrace, London, Alexander Haig, M.A. and M.D. Oxf., F.R.C.P.
JACKSON.—On April 5th, at Folkestone, Edward Jackson, L.R.C.P., M.R.C.S., late of Darlington, aged 78.
LONG.—On Wednesday, April 9th, at St. Martin's-place, Dover, John Reginald Long, M.R.C.S., L.R.C.P., D.P.H. Oxf., Barrister-at-Law, aged 53 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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For complete scale of advertisement charges apply to the Manager.

Notes, Comments, and Abstracts.

THE LIFE AND DOCTRINE OF SIR EDWIN CHADWICK.[1]

BY SIR WILLIAM JOB COLLINS, K.C.V.O., M.D., M.S., B.Sc. LOND., F.R.C.S. ENG.,

CHAIRMAN OF THE CHADWICK TRUST; PRESIDENT OF THE SANITARY INSPECTORS' ASSOCIATION.

PART I.

WHEN invited by your Provost to speak at University College on Sir Edwin Chadwick, his life and work, the attractiveness of the subject chosen and the appropriateness of the *locus in quo* overcame my sense of conscious ineptitude for the graciously allotted task. As chairman, for the time being, of the Trust which bears the name of Chadwick and seeks eponomously to perpetuate his memory and his doctrine, I have dutifully attempted, on more than one occasion, to relate to audiences less august than this the story of his chequered career, whereby he earned the hatred and hostility of many of his contemporaries, the gratitude and veneration of posterity, and his final canonisation as the Father of British Sanitary Science.

As secretary to, and disciple of, Jeremy Bentham, in the later years of the utilitarian sage, Sir Edwin Chadwick, like his master, is intimately associated with this place. Bentham, for whose mortal remains your museum has been a mausoleum and whose counterfeit presentment has recently been enshrined in fresco within your dome, was one of the remarkable group of men who in the 'twenties and 'thirties of last century strove to found a University of London. The great philosopher bequeathed his library in part to this College and in part to Chadwick, while under the Trust established by the latter your professorship of hygiene has received substantial support and appropriately cherishes his memory.

Sir Edwin Chadwick belonged to the noble army of eminent Victorians, whose times and tendencies it is now the fashion to belittle and besmirch, though his early activities in association with Bentham, Grote, and the Mills, father and son, commenced some years before the accession of Queen Victoria. When that reign began, as Sir John Simon truly observes, "there existed hardly a glimmer of intelligent public interest in matters affecting the public health. The changes that came in quick succession during the following decade (1838-1848) were," according to the same eloquent chronicler of English sanitary institutions, "directly due to the zealous labours of one eminent public servant, Sir Edwin Chadwick." The younger Mill, writing in 1835, lamented at that time the aridity of English contemporary thought—"its lack of interest in the great problems of man's life and nature . . . . the nature and principles of human society and the history of philosophy of civilisation."

Even the Radical Benthamite creed, which J. S. Mill and his father did so much to promulgate, while seeking to raise the lot of the worker and urging the physical betterment of mankind, was nevertheless not deeply concerned with such metaphysical problems as the origin of life or the cognate question of the intimate pathology of contagion. Content with improving the material well-being of man as the potent panacea for all physical, mental, and moral ills, it discounted the theologians' ascription of pestilences to the intervention of the Infinitely Great, and dismissed as of small account the microscopists' assertion of the pathogenicity of the Infinitely Little. Happiness was their goal, physical well-being the means, and filth the enemy to be vanquished by personal and municipal cleanliness.

Chadwick's Part in the Rise of Sanitary Science.

The nineteenth century, which gave us Pasteur and Lister and the dawn of bacteriology, had yet earlier witnessed the birth, or perhaps one should say the *renaissance*, of sanitary science, as expounded by Chadwick and his co-workers. While laboratory investigators were claiming to identify one after another the vegetal or animal parasites proclaimed as the causes of zymotic and other diseases, the municipal engineer, the sanitary officers, local administrators, and social workers had been preaching the gospel of cleanly living, improving water-supplies and refuse removal, bettering the housing of the working classes, and claiming that to such efforts were due the reduction in the death-rate and the restriction or extinction of pestilences. These filth diseases, they said, would vanish before the application of what Chadwick had promulgated as his "sanitary idea."

[1] A lecture delivered at University College, London.

Apart from minor matters, mostly of ephemeral interest, Chadwick's teaching is not without its message for us to-day. Some at any rate of our modern sanitarians and sociologists seem to lack the very qualities in which Chadwick was pre-eminent. They have not the massive grasp, the many-sided method of approach, the hold on totality which he so conspicuously possessed. The modern tendency to over-specialise, to carry on research in water-tight compartments, to hunt the little game, to restrict environment to laboratory limitations instead of ranging free o'er all the field of man, to over-accentuate the microscopic, or shall we say the ultra-microscopic, to "tithe the mint and anise and cummin," and omit the weightier matters included in, but not exhausted by, the word "environment" were no part of the moral outlook or mental outfit of Edwin Chadwick. Even Sir Benjamin Ward Richardson, who had so much in common with his hero, alike in heart and head, found Chadwick's personality defiant of ordinary classification and not easy to analyse—"he treated" he said, "all professions with equal freedom, when any subject connected with his own pursuits was under discussion; so that they who listened often wondered, when they were not intimate with him, what his own profession might be."

It was fortunate, indeed, that in the evening of his long life Chadwick found in Richardson, my old friend and colleague, a biographer after his own heart, who under his hero's eye made a worthy record of his varied beneficent activities. In 1887 Richardson published in two volumes "The Health of Nations," a review of the work of Edwin Chadwick with a biographical dissertation. Titularly, the work is reminiscent of, and perhaps conceived as a palinode upon, that other work, its predecessor by more than a century, so much talked of and so little read, "The Wealth of Nations" by Adam Smith. Each is significant of the century to which it belonged. The economics of health arrived upon the scene later than the economics of wealth, and it is perhaps the destiny of twentieth-century legislators and administrators to harmonise the competing claims of the one upon the other. Articles, reviews, reports, memoranda, blue-books flowed in rapid succession for three score years from the facile pen of Edwin Chadwick, and it is well to take down, dust, and re-peruse them, and to reflect on them in the light of twentieth-century sanitary and social science. No one can rise from that task without a vivid impression of their sanity of judgment, their modernity and presage, their large and liberal outlook, their insight and foresight, as well as of the breadth of view and the humanity of the philosophy which inspires them.

"The historian" says Richardson, "will feel no doubt that in this man some peculiar interest was embodied; that the man did some work or works which exerted a striking influence over his time, and caused great changes in its social system; and yet there will be a haze about him which will be scarcely penetrable. The man did and did not. He made laws? Yes. Was he then a legislator? No, not even a member out of office in the lower House. He did something for sanitary improvements? Yes. Was he then a doctor? No, on the contrary, he looked on them as necessary evils, and as not very likely to last." He would, indeed, have been staggered if he had lived to see the day when a State Medical Service was almost on the cards: while his amiable anticipation that "doctors were not very likely to last" was presumably based upon a too roseate expectation of the early advent of an epoch when, thanks to the realisation of his sanitary ideals, doctors would neither be able to live—nor die.

Chadwick's Early Life and Environment.

Chadwick's long life of 90 years spanned the nineteenth century with the exception of its concluding decade. He and the century were in their teens together, for he was born at Longsight, near Manchester, on Jan. 24th, 1800. His times, up-bringing and early associations combined to mould this Lancashire lad into the indomitable and indefatigable social and sanitary reformer for which occasion was so ripe. Ancestry also doubtless played its part in predestinating and fashioning this earnest apostle of "environment." From his grandfather Andrew, who lived to be 96, the friend of John Wesley, he derived, besides a title to longevity, something of the spirit of "the new philanthropy," as Green called it, which sprang from the Methodist revival, and with which the labours of John Howard, Wilberforce, and Samuel Romilly were instinct. From his father, the tutor of John Dalton, he inherited a love of natural history and philosophy, as well as a leaning towards Liberal views and literary pursuit. His mother he "lost too early for the frequent tear," and before he was ten years old he migrated with his father to London, whither the latter had been called to fill the editorial chair of the *Statesman*, a leading Liberal paper of that time.

In London young Chadwick devoted himself to the study of modern languages; he attended no public school except preparatory ones at Longsight and Stockport, and entered for the Bar at the Inner Temple; but with his father's example before him, journalism claimed his early attention. While still a law student he wrote for the *Morning Herald*, the *London Review*, and the *Westminster*, then the vigorous organ of the philosophic Radicals, the Mills, father and son, and Bentham. Articles from Chadwick's pen on "Life Assurance" and "Public Charities in France" stressed the potency of environment on health, and exhibited in embryo his "sanitary idea," which afterwards germinated and developed. An essay on "Preventive Police" attracted especially the attention of Bentham, secured his patronage and friendship, and introduced him into the brilliant circle of the devoted disciples who surrounded the utilitarian philosopher in his closing years.

Bentham, who was born in 1748, three years after the death of Walpole, died the day before the Great Reform Bill of 1832 received the Royal Assent. His personality and doctrine made a deep impression on his contemporaries; his breadth of view and prodigious range of knowledge commanded the veneration and homage of his co-workers and have left their mark alike on morals and on legislation. He had been in early life the friend of Adam Smith, the Wesleys, Mirabeau, and William Pitt; later James Mill, Samuel Romilly, and Etienne Dumont were his comrades and disciples, while in the evening of his life Chadwick and Dr. Southwood Smith resided with him at his hermitage at Queen's-gate, Westminster, and acted as secretaries during the last three years of the octogenarian sage. The subsequent careers of these two notable men afforded indubitable evidence that they had been with Bentham. Southwood Smith it was who performed the quaint last rites when in strict accord with the Master's directions he delivered a funeral *éloge* over Bentham's dissected corpse in the West Street School of Anatomy, amid an awful thunderstorm. Chadwick, less acquiescent, had declined Bentham's offer of an assured income if he would become the propagandist of the utilitarian philosophy. However, besides a share of his library, the Master bequeathed him a legacy. Chadwick had no doubt acquired from Bentham a breadth of view and basic notions of a juridical system which powerfully fomented within him the forces of his developing personality. Before he was 30 he had already become possessed of, or rather possessed by, his "sanitary idea" which his sympathetic biographer Richardson thus defined or described—"It was, that man could, by getting at first principles, and by aiming at causes which affect health, mould life altogether into its natural cast, and beat what had hitherto been accepted as fate by getting behind fate itself, and suppressing the forces which led up to it at their prime source."

The Beginning of his Life's Work.

He proceeded to study typhus fever amid the rookeries of East London and nearly fell a victim to it. He became intimate with John Stuart Mill, and it is said laid unsuccessful siege to the heart and hand of his sister Harriet. Mill introduced him to Nassau William Senior, and through him in 1832 he received the appointment of Assistant Commissioner for the inquiry into the Poor-law which Lord Grey's Government had just resolved to initiate under the chairmanship of the learned and large-hearted Bishop Blomfield. From the vantage ground of this relatively subordinate position Chadwick was started on what was destined to be his life's work. Duty and faculty were united in the enterprise. All sources of information were, with alacrity, pressed into the service of the inquiry. He made investigations on the spot, he saw with his eyes and not with his ears: he indited questionnaires. His reports became models of what sanitary surveys ought to be, and statistical detail and argument formed a conspicuous element in the case he presented to the Commission to which he was later added as a member. Their report disclosed the abuses which had grown up under Acts which purported to amend, but more often had marred, the principles of Poor-law codified in the celebrated 43rd of Elizabeth (1601) c. 2, which put into statutory form what was previously common law practice. It appeared that many justices of their own sweet will ordered relief to any who applied to them independently of the parochial overseers and vestries, and later had purported to fix scales of wages according to the price of wheat and the number in family. The arbitrary law of settlement, denounced by Adam Smith and Burke, continued to tie the labourer to the soil: the burden of rates had become intolerable; pauperism had increased by leaps and bounds, and in the distressful times of the first quarter of last century some £7,000,000 a year were being squandered by 16,500 local authorities in manufacturing able-bodied paupers, without check or guidance from any central authority. The report of the Commissioners, issued in February, 1834, mainly drafted by Chadwick, though claimed by some as the work of Senior, is described by Mr. Fowler in his volume on "the Poor-law" as "perhaps the most remarkable and startling document to be found in the whole range of English, perhaps, indeed, of all, social history." It recommended the formation of a central board to control administration and to prescribe uniform regulations as to relief, while local unions of parishes were to provide workhouses, administer relief, educate and apprentice children, levy rates, appoint paid officers, and render uniform accounts, under central supervision. Relief to able-bodied paupers was to be declared illegal. The law of settlement was to be relaxed. The "principles" of that report, and of the Poor-law Amendment Act of 1834, which speedily followed it, are often referred to, but are not easily disentangled from the copious volumes of the one or the numerous sections of the other. Those principles, alike in the ideals to be aimed at and the machinery to be employed, have been endorsed by the Royal Commission on the Poor-laws which reported in 1909. That Commission reasserted the fundamental principle of the Poor-law Amendment Act of 1834 to be "that the situation of the able-bodied pauper should be, really or apparently, less eligible than that of the independent labourer of the lowest class." The epitomised version of that formula—viz., "the workhouse test"—was, however, never approved or adopted by Chadwick. As regards machinery, 16,500 parishes were consolidated into 660 unions employing some 17,000 paid officers and working under the control of a central board of three Commissioners. The eleemosynary duties of the overseers and justices passed into innocuous desuetude; wasteful expenditure was checked and rates were accordingly reduced.

Paving the Way.

The first three Commissioners, with Chadwick as their most energetic secretary, at once proceeded by rules and orders to regulate outdoor relief, to make proper classification of the infirm, the aged, the destitute, the lunatic, the children, and the vagrant, and to prescribe their respective appropriate treatment—in modern phraseology "to break up the Poor-law." In 1847 the original Commission was dissolved and replaced by a new body including ex-officio Ministers of the Crown, and thus came to be represented in Parliament. In 1849 it became the Poor-law Board, and in 1871 the Local Government Board, whose recent extinction led to the Ministry of Health in 1919.

Chadwick had, indeed, adumbrated the appointment of a Minister of Health and a Minister of Education more than 50 years ago, though it may perhaps be doubted whether he would have been altogether satisfied with those departments as we have them to-day.

The first Commissioners under the Poor-law Act of 1834 were Sir Thomas Frankland Lewis, J. G. Shaw-Lefevre, and Sir George Nicholls, who received £2000 a year each, while their secretary, Chadwick, received little more than half that sum and did more than three-quarters of the work. Lewis and Shaw-Lefevre gave tepid support only to their secretary, and Nicholls was soon despatched to Ireland. Later on Sir Francis Head and Sir George Cornwall Lewis replaced the first Commissioners and acute internal dissensions rent the Board. Lewis developed a bitter antipathy to Chadwick and in 1845 matters came to a crisis over a squabble in connexion with the Andover Workhouse. A committee, of which Disraeli was a member, was appointed to inquire into the affair by the Commons, against the wish of the Government, and reported in vindication of Chadwick and against the Commissioners, who accordingly resigned in 1847. The Press had, from the first, teemed with criticism of the Board—they were "the three Kings of Somerset House"—"the Pinch-pauper triumvirate," while Chadwick was held up to obloquy by the *Times* as "that juvenile theorist of 34—the Sucking Solon of the Benthamite creed." Other work was nevertheless soon found for his indomitable energy. Even while working on the report of the Poor-law Commission and for the Board as secretary he had undertaken other investigations. In 1833 the grim tragedy of juvenile labour in factories had, by a single vote in the Commons, been referred to a Commission, for which the earlier efforts of Sir Robert Peel, the full-blooded denunciations of Richard Oastler, and the sober arguments of Mr. Sadler had prepared the ground. Thomas Tooke, Southwood Smith, and Chadwick were the Commission, and with alacrity they inquired and reported.

Legislation, however, lingered, since the Lords resented what they described as an insidious attempt to introduce by a side-wind universal national education. The half-time system, of which Chadwick was the proud parent, the ten-hours day, the institution of Government Factory Inspectors, and the recognition that injuries of employees were a legitimate charge on an industry, may be regarded as the early or the later fruit of the Commission of 1833.

A Practical Idealist.

In 1834 a committee was appointed, amid derisive levity in the Commons, to investigate the causes of intemperance, under the chairmanship of Mr. J. Silk Buckingham. Chadwick gave evidence before it, declaring that intemperance produced pauperism, and that outdoor relief went largely to the gin-shops, the number of which was grossly excessive. He advocated the provision of playgrounds, the opening of museums and art galleries on Sundays, the encouragement of coffee taverns, and the substitution of light wines for strong alcoholic drinks. In 1838 Chadwick was one of a Commission of three to devise the establishment of a constabulary police force. His colleagues were Sir Charles Rowan and Sir Charles Shaw Lefevre, afterwards Speaker and later Lord Eversley. "Preventive Police," as I have said, had been the subject of a suggestive article by Chadwick in 1829, the year in which Sir Robert Peel's Police Act reformed the London Service and gave us "Peelers" or "Bobbies" in place of the old Charlies of the Dogberry type. Chadwick insisted upon certainty of punishment, rather than its severity, as preventive of crime. He stressed the perils of hoarding and the prudence of banking money. He preferred police to military for preventing and suppressing riots, and in a report to the Society of Arts in 1876 he urged the employment of the police in the extinction of fires. Almost his last essay was one stressing the value of the cycle in facilitating the mobility of the police.

In the first year of Queen Victoria's reign, through Chadwick's inspiration and Lord Lyndhurst's influence, civil registration of births, marriages, and deaths was enacted despite the opposition of churchmen and dissenters, who appeared to regard the reform with much the same repugnance as secular education. It was also at his suggestion that Dr. William Farr (1807-1883), the author of "Vital Statistics" in McCulloch's "British Empire," was appointed compiler of abstracts in the office of the Registrar-General. For 40 years he held that subordinate post and was eminently qualified for appointment to the higher position when it fell vacant in 1879, but political patronage decided otherwise. It is impossible to over-estimate the value and far-reaching effects of Farr's work; by accurate and comparative death-rates, general, infantile, and zymotic, he provided a standard and measure of the influence of those very sanitary measures which his friend Chadwick was so vigorously preaching and practising. The influence was world-wide, and in the language of figures Farr's work speaks in every national and local health report that sees the light to-day.

The year 1839 witnesses the registration of Chadwick's own marriage to Miss Rachel Kennedy, of Manchester; and he transferred his residence from Orme-square, Bayswater, to Stanhope-street, Hyde Park.

Sanitary Reform.

It was from the Poor-law Board of Commissioners, or rather from the brains of their indomitable secretary, that the first Sanitary Commission emanated in 1838, which led up to the great "inquiry into the sanitary condition of the labouring population of Great Britain" of 1842, with which his name is identified, and on which his reputation as a sanitary reformer largely rests. When an epidemic of fever ravaged Whitechapel and Bethnal Green in 1838 he had set Dr. James Kay and Dr. Neil Arnott to report "on the prevalence of certain physical causes of fever in the Metropolis," and Dr. Southwood Smith to investigate personally "the removal by sanitary regulations of the physical causes of sickness and mortality" in some 20 metropolitan unions. It was their reports which induced Lord John Russell to secure the issue of an order by the Queen for a larger inquiry, to cover the whole of England and Wales. The report of 1842, admittedly Chadwick's work, though not bearing his name, has become a classic in the history of British sanitary science.

Modern students of public health would find it difficult to visualise the social misery and mal-hygiene which prevailed among the masses of the people at that date. As Simon points out, when Queen Victoria came to the throne, apart from the futile Quarantine Laws, and an annual vote to the Vaccine Board, the Central Government had nothing to say in regard to the public health, and local authorities had but the most indefinite relation to it. Medicine was now summoned to the service of the State, and the engineer and architect to the aid of the municipality. The first great cholera epidemic which struck Great Britain in 1831 had caused a rude awakening, and served to draw attention to the conditions under which the poor lived and died in large urban communities. The Lords of the Council had indeed in that year issued rules and regulations similar to those drafted by Mead in 1720 and promulgated a form of prayer to be used throughout the land. They also set up provisionally a central board, vested with such sanctions as Orders in Council under the Quarantine Acts could confer, which later were hastily endorsed by temporary statutes. It was not, however, until the Chadwick régime that the potency of filth in air, water, food, soil, and surroundings became recognised in preparing the breeding-ground for epidemics, and sanitary neglect began to be denounced as the nurse, if not the parent, of contagious fevers.

Chadwick's monumental "Survey into the Sanitary Condition of the Labouring Classes of Great Britain" was the final blow to the "letting-things-alone" party in high places, and led to the institution of local medical officers of health. When he and his colleagues visited the fever-stricken homes of the poorest in our large cities, he said, "it was frequently declared by the inmates that they had never for many years witnessed the approach or presence of persons of that condition near them." "The duty of visiting loathsome abodes, amidst close atmospheres compounded of smoke and offensive odours, and everything revolting to the senses is a duty" he said, "which can only be expected to be regularly performed under much stronger motives than can commonly be imposed on honorary officers . . . The descriptions given by Howard of the worst prisons he visited in England (which, he states, were the worst he had seen in Europe) were exceeded in every wynd in Edinburgh and Glasgow inspected by Dr. Arnott and myself in company with the municipal officers of those cities. More filth, worse physical suffering, and moral disorder than Howard describes as affecting the prisoners, are to be found amongst the cellar population of the working people of Liverpool, Manchester, or Leeds, and in large portions of the metropolis." Deaths from fever and small-pox were, he found, almost exclusively confined to the worst parts of the towns. In an epidemic of the latter in Bath in 1837, which carried off over three hundred persons, scarcely a single gentleman and only two or three tradesmen were among the victims. He claimed that by knowing the general lie of a town and the conditions of its poorer dwelling houses, he could postulate the habitat and haunts of infectious diseases. He believed in the common origin of zymotics in sanitary neglect—"that small-pox follows on much the same lines as typhus, so does scarlatina, but with wider deviations as to classes of cases and conditions of persons." Sutherland and Galton, he added, had shown that in Malta plague, cholera, small-pox, and anthrax had in different years been localised in the same squalid quarters. The propagation of fever he traced largely to untrapped drains; and the use of efficient traps and glazed earthenware self-cleansing pipes was early advocated by Chadwick. He had been brought up in the belief that epidemics were largely "climatorial" in causation, but he emphasised the fact that they were "largely communicable by infection." He urged the prompt isolation of infected persons in a well-ventilated chamber, so as to "let a current of air pass through the room and over the patient; to observe all the details of regulations as to cleanliness of the patient and the articles of clothing and furniture, and the removal of excreta." He enunciated precise rules for the sanitary construction of dwellings and hospitals, laying special stress on ample cubic space to get rid of "vitiated, phthisis-producing air, and (if the crowding is intense) fever-producing air." Personal cleanliness as a prophylactic against infectious disease was also accentuated. He said, "If a great epidemic were to occur again, I would proclaim and enforce the active application of soap and water as a preventive. I have had frequent opportunities of observing this plan as a factor of sanitation," and he proceeded to cite examples.

Chadwick's Conclusions.

After a careful examination of the enormous amount of evidence which he had collected, Chadwick thus summed up his conclusion of the whole matter: "That the various forms of epidemic, endemic, and other diseases are caused or aggravated, or propagated, chiefly amongst the labouring classes by atmospheric impurities produced by decomposing animal and vegetable substances, by damp and filth, and close and overcrowded dwellings . . . That such disease, whenever its attacks are frequent, is always found in connexion with the physical circumstances above specified, and that when these circumstances are removed by drainage, proper cleansing, better ventilation, and other means of diminishing atmospheric impurity, the frequency and intensity of such disease are abated, and where the removal of the noxious agencies appears to be complete, such disease almost entirely disappears. That cases of small-pox, of typhus, and of others of the ordinary epidemic occur in the greatest proportion in common conditions of foul air, from stagnant putrefaction, from bad house drainage, from sewers of deposit, from excrement-sodden sites, from filthy street surfaces, from impure water, and from overcrowding in private houses and in public institutions. That the entire removal of such conditions by complete sanitation and by improved dwellings is the effectual preventive of diseases of these species, and of ordinary, as well as of

extraordinary, epidemic visitations. That when such diseases continue to occur their spread is best prevented by the separation of the unaffected from the affected, by home treatment if possible, if not, by providing small temporary accommodation; in either case obviating the necessity of removing the sick to a distance, and the danger of aggregating epidemic cases in large hospitals, a proceeding liable to augment the death-rates during epidemics."

Chadwick saw the urgent need of a radical reform in our local government system before any real advance on the lines he desiderated could be made. He urged the unification of local government services, especially in the metropolis, and he laid it down as a "sanitary axiom that the duty of carrying fouled water *out* of houses and *out* of towns, clear of the sites, constantly through self-cleansing channels, should, with the duty of carrying water *into* houses, devolve upon one and the same authority, and that such authority should be a competent and responsible public one."

The Municipal Corporation Act of 1835 was innocent of any sanitary intention, no duties or powers in regard to housing were conferred on local authorities for another 20 years, and the country at large waited till the 'seventies for urgently needed public health legislation, although certain towns, such as Liverpool, under private Acts, had appointed medical officers of health in the 'forties of last century. It was indeed through the Poor-law and especially its Central Board that sanitary reforms were then promoted, in default of available municipal authorities, especially in rural districts.

Although Chadwick's three-volume report was published in 1842, it was not until confirmed by the Health of Towns Royal Commission in its two reports of 1844 and 1845, and after two ineffectual attempts at legislation in 1846 and 1847, that the Public Health Act of 1848 and the Nuisances Removal and Diseases Prevention Act of the same year reached the Statute-book.

In 1847, after the dissolution of the first Poor-law Board, Chadwick had been placed on a Royal Commission to inquire into the sanitary condition of London. It exposed the lack of unity in metropolitan administration, with its seven different Commissions of Sewers and 100 different paving authorities, its competitive water-supplies from unfiltered river water, purveyed by profit-earning companies on the intermittent system, its open or stagnant sewers, and innumerable cesspools.

The Public Health Act of 1848 was adoptive only, did not apply to London, and was limited in duration (unless renewed) to a period of five years, nor did it give effect to all that Chadwick desired, but it nevertheless for the time being stabilised and strengthened the General Board of Health with Earl Shaftesbury (at that time Lord Ashley) as unpaid chairman, and Chadwick, and later Southwood Smith, as its paid members. It was efficient, economical, assiduous. It applied strong action and stimuli from headquarters to lethargic local authorities and, proceeding by provisional orders rather than by private Bills, it gave umbrage to Parliamentary agents whose emoluments were thereby reduced. Walter of the *Times* renewed hostilities and opposed the metropolitan works of the Board in association with the Commission of Sewers. Hudson, the railway king, and Toulmin Smith and Joseph Hume joined in the game of baiting the Board and chastising Chadwick as the chief offender. The cry of "Centralisation" was raised, the dictatorial edicts and doctrinaire policy of the Board were denounced by the "practical men" who were content that sleeping dogs should be permitted to lie and sanitary neglect continue as ever of old. Lords Shaftesbury and Carlisle, and in the Commons Lord John Russell, endeavoured to shield Chadwick from his traducers. To him were attributed all the sinister designs of the Board against self-complacent Bumbledom and the sturdy apologists of "the wisdom of our ancestors." The wags declared that under the Chadwick régime "it was a perpetual Saturday night when Master John Bull was scrubbed and rubbed and small tooth-combed till tears ran down his cheeks, his teeth chattered and his fists were clenched with worry and pain." Matters came to a crisis in the summer of 1854, when all the disaffected interests became vocal in the Commons, and on July 31st a combined attack on the proposal to renew the Act of 1848, with its General Board of Health, resulted in the defeat of the Government by nine votes in a small House at a morning sitting.

Chadwick Deposed.

The old Board of Health was thus knocked on the head, a new Ministerial body replaced it and paved the way for variations in policy, while Chadwick at the age of 54 was relegated to private life on a pension of £1000 a year. In their final report to Lord Palmerston the Board presented their apologia, and no impartial reader of it at this distance of time can fail to appreciate the immense impetus given to sanitary reform in the quinquennium 1848-54 by Shaftesbury, Chadwick, and Southwood Smith.

Shaftesbury, in his diary, records his chagrin at "being turned off like a piece of old lumber. Such is public service! Some years hence, if we are remembered, justice may be done to us, but not in our lifetime." There was much jubilation amongst the triumphant reactionaries—they said "England wants to be clean, but not to be cleaned by Chadwick," and the *Times* wrote "Æsculapius and Chiron, in the forms of Mr. Chadwick and Dr. Southwood Smith, have been deposed and we prefer to take our chance of cholera and the rest than be bullied into health."

Sir John Simon, who became medical officer of the new Board in 1855, and who introduced a different school of thought and pathological doctrine, nevertheless writing 40 years afterwards tells how Chadwick, who merited the reformer's crown of laurels, became the best abused man of his time. He admits that he may not have been richly endowed with Pitt's sovereign virtue of patience, but he duly adds "patience under sufferings of one's own, and patience towards the sufferings of others, are not equal measures of magnanimity. Mr. Chadwick, beyond any man of his time, knew what large fresh additions of human misery were accruing day by day under the then almost universal prevalence of sanitary neglect; and the indignation which he was entitled to feel at the spectacle of so much needless human suffering, is a not ignoble excuse for such signs of over-eagerness as he may have shown . . . To him this nation unquestionably owes that our statesmen of those times were first awakened to the duty of caring for the public health, and that the first of our modern legislative endeavours were made to bring health under the protection of the Law." Simon testifies to Chadwick's "unique relations to the beginnings of British sanitary reform," and records his unfailing respect for him as "first leader in so great a cause."

(To be concluded.)

A SAFE LITTLE HEATING LAMP.

WE have received from Messrs. Ahlmann (London), Ltd., of 9, Phœnix-place, London, W.C. 1, a little lamp, rather larger than a pocket match-box, provided with the new solid safety fuel known as "Meta fuel," which has, we are told, been submitted to severe tests in many countries and under all sorts of conditions. It was used by the Amundsen Expedition to the North Pole and by the Mount Everest Expedition in 1922. The latter reported, "You have only to put a match to the dry, white bars or cylinders and they burn without any trouble and smokelessly, even at 23,000 feet, for not less than 40 minutes." The fuel meets the need for a small-scale combustible which can be carried about without danger of fire or explosion. It is recommended by the makers for travelling, camping out, and picnicking parties, and the lamps would certainly be useful in the nursery and sick room. Such a heater might find a place in the kit of the surgeon or bed-side pathologist. A small heater (roughly the equivalent of a 2-oz. spirit lamp) costs 7*s.* 9*d.*, packets of fuel being supplied at 1*s.* for 20 bars.

A WARNING.

To the Editor of THE LANCET.

SIR,—On March 17th a man came to this hospital and said he had met with a motor-cycle accident. He gave his name as John Bland Sutton, aged 28 years, and stated he was a medical practitioner, and a nephew of a noted London surgeon (not Sir John Bland-Sutton). In view of this he was given preferential treatment and the use of a private ward. After being under observation for 10 days it was found to be an imposture, further the man attempted to leave the hospital unobserved.

I bring this matter to your notice that other hospitals may be forewarned.

I am, Sir, yours faithfully,

E. M. PORTER,
Secretary, Nelson Hospital for Wimbledon, Merton, and District.

April 5th, 1924.

Corrigendum.—Dr. J. C. McVail writes to point out that in his article on Small-pox and Vaccination, published in last week's LANCET, a sentence in the second column of p. 769 should read: "Sanitation having taken 10 years to reduce the rate from 6 to 5·3 per cent., suddenly, in a period of weeks or months, reduced it to 1·3."

Surgeon Rear-Admiral (retd.) would like full or part-time employment, where long medical and administrative experience is needed.—Reply, Editor of THE LANCET, marked "Private."